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The *Railroad Age Gazette* announced on May 7 that it would pay seventy-five dollars, under conditions named, for the best article on how to be a first-class trainmaster; fifty dollars for the second best article, and at regular rates for any other articles accepted. The conditions were stated as follows:

(1) The author must have had at least one year's experience in the position of trainmaster (or an equivalent position, whatever its name); must have had this within three years past, and must send with his paper a brief account of his experience and schooling; also say in what state or states he has lived.

(2) The author's name and address should be sent in a separate sealed envelope.

(3) The paper must not be less than 1,000 words long nor more than 4,000 words. It must be typewritten.

(4) All papers must be in our hands by July 15.

SUGGESTIONS.

Give facts, and be sparing of generalities; the generalities are pretty well known. But your theories will be interesting, provided you can illustrate them cogently from experience.

Do not be afraid to illustrate with accounts of actual occurrences on your own road; you can disguise names and dates if compelled to.

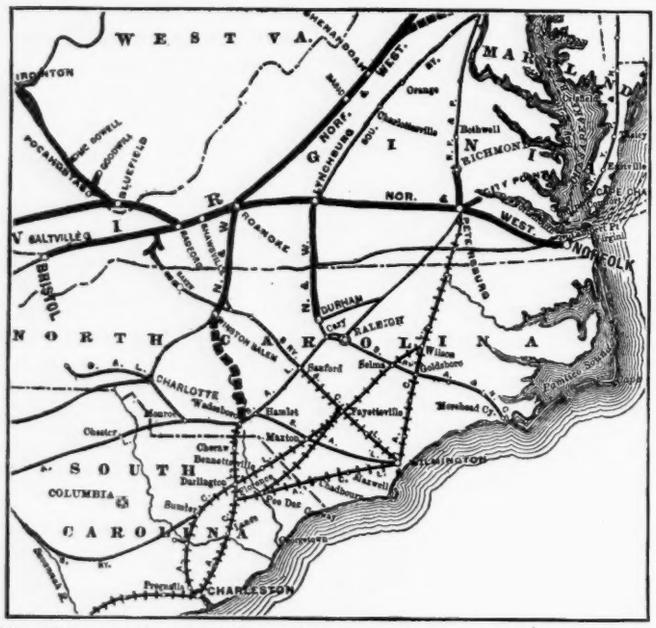
We have received a fairly large number of papers in this competition, but shall welcome more. This is the last call.

Great interest is taken in Germany in the Transportation Exhibition to be held in Buenos Aires next year, and the German imperial authorities have appointed a man to receive applications for space and other communications concerning it. As Argentina imports nearly all its railway materials, and as it is bordered by countries like Chile, Uruguay and Brazil, which are also fields for railway construction and markets for most kinds of railway material, all countries which export such material have good reason to be interested. It is now reported that applications for space may be handed in as late as Sept. 10 of this year. The original limit was July 31.

There is probably a larger area of metal surface exposed to corrosion in steel cars than in all other railway structures combined, and considering the activity of this corrosion and the inability of the paints in general use to protect steel cars, it is unfortunate that the M. C. B. Association is making so little progress in finding better protective coatings. The report presented at the recent convention is but a continuation of ineffective and misdirected efforts reported the year before. With proper respect to the practical experience of the committee, we believe it is working in the wrong direction, and its crude methods belong more to the period of alchemy than to modern times, which have the advantage of chemistry as a real science, and electro-chemistry, which is making so much progress in explaining the real cause of corrosion. The present committee is so fixed in its theory that greases and oils which do not harden should be applied after the regular coating of paint has dried, that it will be difficult for it to become interested in other more scientific and reasonable methods of making protective coatings for steel. Within a short distance of the convention hall at Atlantic City there is a long fence covered with test plates of steel of different qualities covered with various protective coatings, and here is being conducted the largest and most intelligent experiment with paints for metal surfaces ever undertaken. It is doubtful if any member of the M. C. B. Committee on Painting Steel Cars took the time to examine this important and instructive exhibit, as the report makes no reference to it or to the work of the other technical societies which have charge of the test. While the committee was instructed to investigate the work of these other societies and work with them, it is doubtful if a body of men which does not take up such duties on its own initiative can be induced to work effectively with others whose point of view is so totally different. The M. C. B. Association should appoint a committee of motive power men who employ chemists and engineers of tests who belong to the Society for Testing Materials, and have the work done under the direction of technical men. The corrosion of steel and the best methods of preventing it is a subject which is beyond the paint shop, and little will be accomplished until it is taken up in a scientific way in the manner we have here indicated.

The accompanying map shows a line about 90 miles long which is now being built jointly by the Norfolk & Western and the Atlantic Coast Line to give the Norfolk & Western an outlet into the region around Charleston and south for its Pocahontas coal. The starting of work on this line is another indication of the keen competition now going on for the sale of bituminous coal in the southeastern states. The line under

construction is by no means a new project, but since the receivership of the Norfolk & Western in 1896 the management considered that money spent to strengthen the western and middle parts of its lines yielded a more immediate return, and therefore held the project for this 90-mile line in abeyance. With the completion of the Carolina, Clinchfield & Ohio to Spartanburg, S. C., it is able to distribute its coal by way of the Seaboard Air Line, which is very closely allied in interest with the Carolina, Clinchfield & Ohio, through Carolina, Georgia and Florida. It will be seen on the map that the



New Line of the Norfolk & Western and Atlantic Coast Line.

The Norfolk & Western is shown by heavy black lines, the Atlantic Coast Line by cross-hatched lines and the new line by heavy dotted line.

Sanford, and from there ship over the Atlantic Coast Line, but the Southern has soft coal of its own and therefore did not want to handle the Norfolk & Western's coal. The Atlantic Coast Line, on the other hand, has no great amount of coal itself, and the added traffic will be of material benefit to it. This is also, of course, a move to strengthen the position of the Norfolk & Western as against competition by the Virginian. The advantage of reaching the territory south of Norfolk directly will give the N. & W. a territory in which to distribute its coal free from the competition of the Virginian.

The press agent of the Pennsylvania Railroad has taken it upon himself to educate the public on uniform freight classification—a thing which the Interstate Commerce Commission for 15 or 20 years has been declaring can and should be accomplished but which still remains in limbo. The press agent has done his job skilfully. Within the last year or two the railways have somewhat changed their policy. The diplomatic traffic officer, instead of telling state and federal commissioners and board-of-trade secretaries that their proposition is out of the question, because it cannot be accomplished without raising or lowering thousands of rates and probably working injustice to nine-tenths of the shippers and giving no satisfaction of any consequence to a single one of them, has given up the hopeless task of trying to convince them of this evident truth, and has concluded to talk along the line of least resistance. Yes; uniform classification is desirable. We have tried to establish it. We will try it again. We will do all we can for you. We will appoint a committee. We will set stronger men at the job. We will work diligently without intermission. This is paraphrased by our Pennsylvania friend as follows:

A general executive committee has been constituted to work in connection with the three territorial classification committees and the various rate organizations, to endeavor to shape the action of all these bodies toward the common end. Under the jurisdiction of this executive committee, a working committee with representation from each of the classification territories has been appointed to continue the work of unifying the rules, the minimum carload weights, and the descriptions of articles. While that is going on, the several classification committees and the various rate organizations are also co-operating, adding constantly to the number of uniform ratings, and modifying rate scales in order to bring about conditions which will eventually enable a uniform freight classification to be established with the minimum of friction, criticism and trade disturbance.

But the difficulties are as great as ever. The circular says that in the Southern Classification there are 3,503 less-than-carload and 773 carload ratings, the carload ratings being 22 per cent. of the L.C.L. ratings. In the Official Classification there are 5,852 L.C.L. and 4,235 C.L.; the C.L. ratings being 72 per cent. of the L.C.L. In the Western Classification 5,729 L.C.L. and 1,690 C.L. ratings; the C.L. ratings being 30 per cent. of the L.C.L. In the Southern Classification 33 per cent. of the L.C.L. ratings are in the fifth, sixth and lettered classes. In the Official Classification only 1.25 per cent. of the L.C.L. ratings are below fourth class. In the Western Classification no L.C.L. ratings are below fourth class. To reconcile such ratings, says the circular, it was evident that material advances and reductions in rates would have to be made, the effect of which either upon trade in general or upon the revenues of the railways it would be difficult [impossible] to calculate. The committee came to the conclusion therefore that unification of *descriptions* of articles, uniformity as to *minimum carload weights* and as to classification rules would be the most hopeful direction in which to begin its work; and that is what is being done. When the committee has done what it can on this line, we shall see what we shall see.

RAILWAY POLICY AND OPERATION IN MEXICO.

The physical merger of the roads controlled by the Mexican government, composing the National Railways of Mexico, was effected on February 1, 1909.* Enough time has not since elapsed to judge of the results of the government's policy; but enough has been done to indicate clearly what that policy will be as long as Mexico has its present rulers, or others prompted by the same motives and guided by the same ideas. It has been well said by one who is thoroughly familiar with Mexican transportation affairs that "the government now controls railway policies but not railway operations." Of course it is impossible to draw a line just where railway operation ends and railway policy begins; but the distinction is clear enough for practical purposes.

The fundamental principle of the government's railway policy is that the roads which it controls, and those which it does not control, so far as practicable shall be run primarily for the benefit of the entire country. Before the merger the government restrained the construction of wasteful competing lines. It now seeks to prevent not only wasteful competitive construction, but also wasteful competitive operation both between the controlled lines and between them and the privately owned lines. It aims to stimulate new construction, but it wishes new roads to be built not where they will divide an already scanty business with existing lines but in parts of the country where they will create new industry and traffic.

How policy affects operation is shown by the action of the roads in consolidating their agencies at junction points in Mexico, and also their agencies in the United States and other foreign countries. Substantial economies have also been effected by the substitution at numerous junction points of one officer in charge of a particular work for two or more who formerly had charge of the same work for different roads. For example, at Monterey and other points there is now only one terminal superintendent where there were formerly two. Similarly, at Monterey, two yard engines and their crews are

*See *Railroad Gazette*, July 19, 1907, page 56, for an editorial outlining the plans for the merger of the National Railways of Mexico.

made to do the work that formerly was done by five or six. Between Torreon and Monterey the Mexican International and the Mexican Central have parallel lines which formerly were competitors. The traffic between these points is now handled by the line of least resistance, thus reducing operating expenses to a minimum. A similar course is followed in other sections where there are parallel lines. It is even probable that some existing lines which parallel other more direct routes will be torn up and those left so improved as to give better service than is rendered now at much greater cost. The rolling stock of all the merged lines has been pooled, which has tended very materially to reduce expenses. As is well known, there are still several lines in Mexico that are not controlled by the government. These include the Mexican Railway, which is owned by English interests and is the best and really the only profitable line in the country. While the Tehuantepec National and the Vera Cruz & Pacific are owned by the government, they are not operated as a part of the national system. The merged lines have traffic pooling arrangements with these roads which are operated independently. It is reported that a new union station for the accommodation of the merged roads will be built in the City of Mexico; but if such a plan is being given at all serious consideration it may be stated with much assurance that it will be a long time before it is carried out. Numerous other changes along the lines of those above mentioned are being made or projected and unquestionably the aggregate saving effected will be very large.

While these changes in methods of operation are going forward readjustments of rates are being made which also are shaped by the government policy of using the railways as instrumentalities for the development of the country. The National Railways recently put into effect new rates on coal and coke, which will be good for the coal operators of Mexico but bad for those who have been exporting these commodities to Mexico from the United States. A very large amount of coal has been transported by water from Atlantic seaboard ports, chiefly Baltimore and Norfolk, to Mexican ports, chiefly Tampico and Vera Cruz, at very low rates. A good deal of coal from the United States also moved to Mexico through the border points of Laredo and Eagle Pass. Within the last few years the development of the coal industry in Mexico has been rapid, but the low rates by rail and water on coal from the United States have prevented the coal operators in Mexico from getting control of the home market. They have, therefore, clamored for changes in freight rates that would put them in a more advantageous position. The new freight tariff fixes a rate of $1 per ton less on native coal and coke moving to the City of Mexico than on imported coal and coke. It is believed that this differential will make it impossible for coal and coke from the United States to compete in the Mexican markets with that produced in Mexico. It is well known that the governments of Europe which own and operate railways adjust their rates on exports and imports so as to stimulate the growth of the former and restrain the growth of the latter. The action taken in regard to rates on coal and coke indicates that the Mexican government intends to adopt a similar policy. The officers of the railways have submitted a very elaborate plan for the complete revision of rates, but this has not received the approval of the public authorities.

The situation as respects the making and regulation of rates is rather peculiar. All changes in tariffs must be approved by the railway commission before being put into effect. Theoretically, the initiation of all rates is in the hands of the road, but the commission approves or disapproves of proposed rates. As the government controls the board of directors of the holding corporation, and as the directors are, of course, supreme over the traffic and all other officers of the roads, it might seem that the government has sufficient control of rates without the intervention of a regulating commission—that the commission has been made by the merger a sort of a fifth wheel. But of course the supervision of the commission extends over the non-controlled as well as over the controlled roads. And even if all roads were brought under the control of the government, the commission might be usefully retained as a sort of buffer between the management of the roads, anxious to make as good a showing of earnings as possible, and shippers and travelers, anxious to buy transportation as cheaply as possible.

That the government will have a hard task in converting the merged lines into efficient facilities of transportation is not doubted by those familiar with the conditions with which it has to deal. The average rate per ton per mile of the Mexican Central is 2½ cents, Mexican currency. This in American currency would not be a great deal more than the average rate of the Missouri, Kansas & Texas, or of the Union Pacific. The number of tons carried one mile per mile of road on the Mexican Central in the year ending June 30, 1907, was only 265,177, while the traffic density per mile of the "Katy" is almost 90 per cent. greater than this, and the traffic density of the Union Pacific is 100 per cent. greater. On the Mexican Central the number of tons of freight per train mile averaged in 1908 something over 350 tons; in 1907 it was only 261 tons. On the Union Pacific the average number of tons per train in 1907 was 475, and in 1908, 512. On account of the mountainous country operating expenses are necessarily high in Mexico. Consequently, under the very best management the state roads will be apt to find it difficult for years to come to make rates that will not be so high as to be a burden to the small traffic, and at the same time so low that the public treasury will not have to be resorted to to pay operating expenses and guaranteed interests and dividends.

So long as President Diaz, or a man of equal ability, dominates the entire government, the operation of the roads may be expected to grow increasingly efficient. But there will always be the danger that control of the government, and with this control of the railways, may be obtained by those who will use the roads for political purposes—who will build new lines not where they are most needed and will be most useful to the country, but where they will be most useful as pawns in the game of politics, and will increase the number of employees in order to increase the number of votes which they can control instead of reducing the number in the interest of economic operation. However, President Diaz and the finance minister, Mr. Limantour, who is also the Chairman of the Board of the National Railways, seem to entertain a cheerful confidence that no political changes are probable that will interfere with the government carrying out for an indefinite period the railway policy which it has established.

THE DISMISSAL OF THE NEW HAVEN SUIT.

On May 22, 1908, more than thirteen months ago, the federal district attorney at Boston, acting presumptively under orders of the Department of Justice at Washington, began the suit to prevent the merger of the New Haven company with the Boston & Maine, and also to prevent the control by the former corporation of its 1,300 or more miles of trolleys in three states. The suit was brought under the Sherman Anti-Trust Act of 1890, alleging that the merger and the trolley control were an anti-competitive restraint. Then the big guns of the law began their volleys on both sides. There was a demurrer and a second demurrer both overruled. There were briefs that were anything but brief, and multiplied legal verbiage, vocal and printed. Then the case harked back to the original complaint, with vistas of a year or two of litigation ahead. This brought it down to a new administration and attorney-general. And now, after costing probably not a few tens of thousands of dollars, and complicating the Massachusetts state suit against the New Haven corporation—and incidentally shadowing the market value of the securities of both the companies—the case is summarily dropped.

The dismissal of the suit is wiser and more laudable than

the suit itself; but the grounds assigned for the dismissal are such as to make even the untrained layman open his eyes. The prime cause officially stated is that Massachusetts, "the community most directly affected," has authorized the merger by the new act establishing a holding company for the Boston & Maine shares, that company to be controlled by the New Haven. But the suit annulled was a federal suit, in a federal court and resting not on state law but on federal law. Or, going back still further to fundamentals, did it not rest on actual or alleged physical conditions that, from the federal viewpoint, were in restraint of competition and violative of the Sherman Act? It puzzles the laical mind to see how either physical facts or federal law have been changed by a Massachusetts (state) statute. So, too, with the trolley ownership. How have the merits or the physical relations of the trolleys to their owning corporation shifted since the ill-judged suit began?

What has actually happened can be read between the lines of the Attorney-General's statement supplemented by a brief glimpse at the historical record of the case. Early in 1908 when the "big stick" was actively a-whirl, and after the Massachusetts suit against the New Haven's trolley holdings in that state had begun, Attorney-General Bonaparte cast his eye on the New England railway situation. With Massachusetts aroused, pro and con, over the merger, it seemed a rare chance for a theatrical play. There is internal as well as external evidence, however, that President Roosevelt was not in full accord with his Attorney-General. There was a printed report, never retracted, that the President had, to say the least, strongly intimated to a prominent New Haven railway officer that the suit would not be brought; that the papers were sent out prematurely by the Attorney-General, temporarily recalled, and that between him and the President there was an "incident" of ill-feeling; and that the singular omission of the New Haven's navigation properties from the complaint was due to a presidential pledge connected with the threatened Morse monopoly of the coastwise trade and his offer of $20,000,000 for the New Haven's boat lines. But the legal complaint, in the form of a bill in equity, was filed, and the big suit which attracted attention all over the country and, to a degree, hit Wall Street, was joined.

Since then other things have come to pass. Massachusetts has sobered down and her citizens grown tired of the endless jungle growth of litigation. The case has also reached out into state politics. "Interests" have been stirred represented by a good many thousands of New Haven and Boston & Maine security holders. Those interests have votes, control other votes, and incidentally supply the sinews of war in party campaigns. To such influences may plausibly be attributed the new holding company act of Governor Draper. From the technical point of view the federal government also had its own difficulties in the suit. There has been the Billard transfer putting the Attorney-General in the position of suing a sympathetic relation of a man to a corporation; the legal hardship of proving the two roads competitors rather than connecting systems; and the trolleys, whose extra-actionable status the Attorney-General now concedes. What wonder that the department of justice is willing to screen itself even behind a state law to secure a retreat—a retreat, by the way, which looks very much like a prearrangement with the Massachusetts authorities!

So ends another episode of railway baiting which would be farcical but for the magnitude of the interests involved, besides interests to a less degree sacrificed. It is not quite true, to translate the Latin saw, that out of nothing nothing has come, for there has been, if nothing else, the lesson of experience. And, as evidence of the new attitude of a new administration, the dismissal of the suit is not without its broader meanings. Beyond lies the inevitable merger yet to be fully consummated, by which practically all New England will pass under the control of a single railway system with all that such a merger implies in the railway relations of that region to the rest of the country. That long-disputed merger has now, seemingly, passed beyond the limbo of legislation and the courts and entered on the stage of mere detail.

NEW PUBLICATIONS.

Poor's Manual for 1909.—Poor's Railroad Manual Co., New York. Price, $10.

Poor's Manual for 1909 (forty-second annual number) is issued. It is the largest volume of the entire series, being about 100 pages larger than the 1908 book and about 400 pages larger than the 1907 book. The data covers the 1908 fiscal and calendar years and contains important information received as late as June 5, 1909.

All the leading features of the 1908 edition, including a comprehensive industrial section, the ready reference bond list and the tables of annual meetings and dividends have been continued in the 1909 edition. The industrial section in particular has been improved, comparing very favorably in completeness of details and in style of presentation with the railway section.

The total length of railway completed on December 31, 1908, was 232,046 miles. The net increase in mileage in the United States in the calendar year 1908 was 3,918 miles. The following table shows the assets and liabilities of all railways in the United States for 1908 and a comparison with 1907.

	1908.	1907.
Miles of line	230,084.65	224,382.19
Liabilities.		
Capital stock	$7,641,913,086	$7,458,126,785
Bonded debt	8,788,518,045	8,228,245,257
Other bond obligations	804,455,084	815,041,027
Accrued liabilities	109,013,608	94,938,347
Miscellaneous liabilities	113,461,262	75,450,828
Bills payable and c't accounts	940,361,739	857,734,167
Sinking funds, etc.	246,833,997	239,727,545
Profit and loss	831,298,738	880,035,294
Total liabilities	$19,475,855,559	$18,649,289,250
Assets.		
Cost, railroads and equipments	$13,902,227,797	$13,364,275,191
Stocks and bonds owned	3,012,575,629	2,884,031,173
Real estate and other investments	926,287,633	738,843,199
Cash, bills rec'vable and c't acc'ts	1,011,685,994	979,730,908
Materials and supplies	223,784,568	224,237,534
Other assets	171,203,159	208,171,082
Sinking funds	122,313,373	159,592,350
Profit and loss	105,777,406	90,407,813
Total assets.	$19,475,855,559	$18,649,289,250

The Manual of Statistics, 1909. Published by the Manual of Statistics Co., New York. 1094 pages. Price, $5.

The great value of this manual of statistics is the breadth of field covered. Statistics for railway and industrial companies are taken from annual reports and other documents and in most cases include figures for 1908. Beside these figures there are financial statistics of government loans, and tables are shown giving the prices of securities dealt in on the various exchanges in the larger cities. Bank stocks, cotton, produce and mining stocks are also quoted. The book will form a useful and handy part of a banker's or investor's library.

Graphical Determination of Earth Slopes, Retaining Walls and Dams. By Charles Prelini. New York: D. Van Nostrand Co. 129 pages; 6 in. x 9 in.; 75 illustrations. Cloth. Price, $2.00.

This book is intended solely for the use of students and teachers, but not for the practising engineer, although it may be of some help to the latter. In it the graphical method of determining the stability of earth slopes and the pressure on retaining walls is used and demonstrated. In this numerous assumptions, such as the cohesion and friction of the material are made for the determination of the angle of repose. Items that are not only difficult to ascertain in actual practice but not worth the trouble and expense involved, when compared with an empirical assumption in which there is an ample factor of safety assumed. So, while the outlines and method of work involved are valuable from a mathematical standpoint and embody principles with which every engineering student should be familiar, they cannot be used in detail in the field or even in the determination of quantities, because of the necessary allowances that must be made.

The book is divided into five chapters dealing with the stability of earth slopes, retaining walls treated by the graphical and analytical method, as well as their design, and dams which are regarded as retaining walls, in which the material to be sustained is deprived of friction.

In discussing the analytical method of retaining wall calculation, those of Rebmann, Rankine and Weyranch are successively taken up.

A criticism that may be made is that the author occasionally takes something for granted as being well known or self evident, which is not, and in a few instances has failed to clearly indicate the significance of some of the symbols used in formula or demonstration. This puts the reader or student to a needless amount of search that may not always result satisfactorily.

As a textbook, however, it will probably serve its purpose well, as it was prepared especially for use in Manhattan College, where the author is professor of civil engineering, and therefore, presumably, conversant with the needs of the students under his charge.

Letters to the Editor.

TRANSCONTINENTAL FREIGHT RATES.

Oklahoma City, June 18, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I have been very much interested in the articles regarding transcontinental freight rates which have appeared in your issues thus far. For example, this paragraph in your issue of May 14 brings up a very nice point:

"Conceding that water competition from the eastern seaboard, and even from points as far west of the Atlantic as Pittsburgh and Buffalo, is controlling to the Pacific coast, what good reason, it may be asked, is there why rates from places as far from the Atlantic Ocean as Chicago and St. Paul should be lower to the Pacific coast than to intermediate cities? Perhaps this adjustment cannot be defended successfully as to all commodities to which it is applied, but it is not hard to say why it exists. It is due to commercial as well as to transportation competition. Take, for example, the rates on steel and iron products. These commodities are manufactured at Pittsburgh and at points farther east and also in the Chicago district. Water competition forces a lower rate from eastern points to the Pacific than to Spokane and to other inland cities. If the western roads do not make as low a rate from Chicago to the Pacific coast as is made from the eastern seaboard, business men on the Pacific coast naturally will buy iron and steel from the mills in Pittsburgh and further east in preference to mills at Chicago, and the lines running west from Chicago will not get to haul these commodities at all; but because water competition thus forces a low rate from Chicago to the Pacific coast it is not considered as sufficient reason why the same low rate should be made to intermediate points, such as Spokane, where this competition does not operate."

This simply demonstrates the truth of the old saying, "He who has a goose will get one." This system has led to more dissatisfaction than any one proposition connected with rates made to meet water competition, because of the fact that the western manufacturer, who is a big man or a big firm, and offers a large tonnage, is able to induce the railways to protect him as against the manufacturer located upon the Atlantic seaboard. There is not one valid reason why it is not just as obligatory upon the railway to protect the jobber or dealer located in Spokane against the jobber or dealer located in Seattle or Portland. It may be said that he gets more revenue out of the same rate from Chicago to Seattle than he gets out of the rate from New York when it has to be divided with the lines east of Chicago, but it is equally true that he would get still more revenue for much less service by making the same rate from Chicago to Spokane; and when the railways take it upon themselves to protect the manufacturer at one end, they should equally take it upon themselves to protect the jobber at the other end, when the haul is much shorter and less expensive.

I certainly have been amused by the logic of William R. Wheeler, manager of the Traffic Bureau of the Merchants' Exchange of San Francisco, as published on page 1182 of your issue of June 4. In the first place Mr. Wheeler objects (on account of its insufficiency) to the same reduction of 16⅔ per cent. being made in the rates from Pacific coast points to Spokane, and by, inference, demands the same flat reduction in cents per 100 lbs. as is made from St. Paul.

This is the first time I ever heard of a man claiming that he ought to have a greater percentage reduction in a low rate than in a high one or for a short haul than for a long one. There is, to my mind, no fairer basis for reducing rates than on a percentage plan, and certainly the low rate for the short distance should not be reduced by a greater percentage than the high rate for a long distance. Mr. Wheeler also believes that the Pacific coast distributor should have an opportunity to do business in Spokane at precisely the same rate as the Spokane man enjoys. He says: "Assuming that the rate on a given commodity from New York to Seattle is $1 per hundred, and the local rate from Seattle to Spokane is 75 cents, thus, under the present method of tariff construction, making the rate from New York to Spokane $1.75, this gives the Seattle distributor a fighting chance in Spokane." Quite true! it gives the Seattle jobber a chance to do business with the Spokane jobber on equal terms in the latter's own town, but what does it do to the Spokane jobber at all points west, or even the next point west, as compared with Seattle? How would Mr. Wheeler like to reverse the condition and give Spokane a rate system which would enable it to monopolize its own trade, get a great advantage at all points between Spokane and Seattle, and break even with Seattle, even in the latter city? And this system would be the more sane and sensible from a railway standpoint, service and convenience considered.

I do not believe the Spokane jobber fears competition from the New York distributor. The New York man, the Pittsburgh man or the Chicago man is not a jobber of freight in the sense that he competes for the retail trade on the Pacific coast, but is a manufacturer, or a manufacturer's agent, and is selling to the jobbers located at Spokane and the Pacific coast cities, who in turn compete for the retail trade. I do not know that I endorse all of the plan suggested by the railways for settlement of the present difficulty, but I will say that it is unquestionably much more businesslike and sensible than the plan upon which rates have been made in the past. If they are disposed to make proportional rates from Chicago to Seattle and Spokane, upon business originating in New York, they are at least handling the business in direct line of transit and are, I presume, getting paid as liberally for the service performed, distance considered, as they did in the past. Why should not the railways accept less money for a haul from Chicago to Spokane upon a carload of goods than for a haul from Chicago to Seattle and then back to Spokane upon the same goods? Very true, it may be said, that in some instances the shipment would not make the entire trip but would be dropped off, but it is also true that in many cases the railways would have to actually perform the extra service for no greater revenue.

I have no more respect for the plea of the Chicago manufacturer regarding his cost of production than I have for the plea of the jobber or retailer located at Spokane who is trying to build up a business against his Pacific coast competitor, which business involves less service upon the part of the railways and which, in my judgment, ought to cost him even less expenditure for transportation service. I hope to live long enough to see the day that the plan proposed at Spokane will also be applied at Reno, Las Vegas, Albuquerque, Tucson and Salt Lake City, for in my judgment the time must come when railway rates will be based upon the service performed, irrespective of the locality, and when one part of the country will not have to make up the deficit caused by hauling freight too cheaply to some other part of the country. In this connection I would like to call your atten-

tion to an extract from a resolution adopted a few days ago by the Federal Commercial Clubs of the State of Oklahoma regarding the improvement of waterways which reads as follows:

"Resolved further, That when such streams are improved and made navigable, the National Government should protect same from the ruinous competition of the railways on account of the latter making rates temporarily low, in order to drive the water carriers out of business, and when so driven out, by increasing rates, at will, to the former figures, by amending the Interstate Commerce law, so that rates made by railways to meet water competition, shall not be exceeded at intermediate points, and that no higher rates per ton per mile shall be made by the same railway to points not intermediate, but where the cost of transportation by rail is no greater."

The most fruitful source of dissatisfaction with rates in the United States to-day is the awful disparity existing between rates made to so-called water points and those made to inland points, intermediate, or if not intermediate, not more distant, or where no more expensive service to the railway is involved.

Of course I appreciate, as does every student of transportation, that this is a tremendous tangle to straighten out, but it has to be done, and the sooner it is begun the sooner will the people of the entire United States be satisfied with transportation conditions.

J. H. JOHNSTON,
Traffic Manager, Oklahoma Traffic Association.

MODERATELY SUPERHEATED STEAM.

Paris, June 1, 1909.

To the Editor of the Railroad Age Gazette:

I am to-day in receipt of your issue of May 21, containing a letter from H. B. MacFarland criticising the curves in my recent article on the advantages of moderately superheated steam. I suggest that it would have been better for Mr. MacFarland to have studied more carefully the conditions the curves represent before writing of "inaccuracies." As it is, he is entirely wrong in saying that I have shown two exponential curves with different exponents, starting from the same point and passing through a second common point. I drew exponential expansion curves from the point of cut-off, at 25 per cent. of the stroke, to the point at which the exhaust opens, at 70 per cent. of the stroke (the letter press says 60 per cent. by mistake). When the exhaust opens the expansion ceases to follow the exponential curve, and from this point I drew straight lines to the back pressure, assumed the same in both cases, at the end of the stroke. These straight lines will be sufficiently close to the real line for all practical purposes. Mr. MacFarland should have completed his letter with an account of the valve motion he had in mind in making his recalculations of my curves, and which allows the exponential expansion to be continued to the extreme end of the stroke before the exhaust opens! With this a further innovation must be introduced so as to empty the cylinder instantaneously! This is *not* in accordance with usual locomotive practice. For the compression curve I assumed an equilateral hyperbola, which represents the actual conditions with all necessary accuracy.

LAWFORD H. FRY.

Contributed Papers.

ARBITRATORS' DECISION ON GEORGIA STRIKE.

The arbitrators appointed to settle the controversy which caused the strike of firemen on the Georgia Railroad, May 17—David C. Barrow, Hilary A. Herbert, Thomas W. Hardwick—announced their decision last Saturday. The finding does not exclude negroes from the service, but requires that they shall receive the same wages as white firemen. The arbitrators take up in order the six claims presented to the road by the employees, and each one is decided separately, by a majority vote, but the majority is not the same on all the questions. The six points are, in brief: (a) That the road will not employ negroes as firemen, hostlers or assistant hostlers; (b) firemen must have three years' experience before being promoted; * * * shall be promoted by seniority if able to pass reasonable examinations * * * ; (c) new men shall be put in freight service, yard service or hostling, and "senior white firemen shall have preference of engines and runs"; (d) all hostlers to receive their present rate of pay; assistant hostlers to be treated as yard firemen; (e) passenger, through freight, local freight and yard engines "not to be blocked by non-promotable men"; (f) firemen not to be required to throw switches or flag street crossings.

The firemen also ask that the ten white hostlers who had been dismissed, and then restored, should not be disturbed. The preliminary agreement also provided that the award of the arbitrators should be filed in the United States circuit court; should be conclusive upon both parties, except in case of errors of law; should continue in force one year, and should be enforceable in a suit in equity.

Clause *a* was decided, by Messrs. Herbert and Barrow, to the effect that the road, "when using" negroes as locomotive firemen or as hostlers or as hostlers' helpers, shall pay them the same wages as white men in similar positions. Mr. Hardwick dissented, not because he objected to equality of wages, but because he believed the employment of negroes a menace to the safety of the traveling public.

Clause *b* was unanimously approved. Clause *c* was rejected, Mr. Hardwick dissenting. Clause *d* was unanimously approved. On clause *e* the arbitrators decided unanimously that—

"In assigning vacancies to firemen, senority alone shall not control, though it may be considered in connection with the efficiency, and with the necessity where it exists of giving experience to candidates for promotion to the position of engineer."

Clause *f* was unanimously rejected.

The press despatches gave little information as to the effect produced on the public mind by the announcement of the decision, except that "both sides were satisfied." Three days afterward, however, bills were introduced in the state legislature, designed to get rid of the negroes by other means. One bill proposes an educational qualification for firemen and another would exclude them from locomotive service altogether.

FOREIGN RAILWAY NOTES.

The Japanese talk of establishing a steamer line between Dairen (formerly Dalny) and Melbourne, Australia (which are some 4,500 miles apart), to capture the Australian passenger traffic, which, by the Siberian Railroad and this steamer line, would save some 10 to 15 days over the direct steamers from England to Australia.

The Executive Council of the Swiss State railways commenting on a decrease of 11½ per cent. in the surplus net earnings in 1908, when the estimates at the beginning of the year was for only a nominal decrease, say, that the public easily forgets what great progress the state railways have made. The eagerness for improvements in facilities of every kind was at first unlimited; and no one troubled himself about the cost. The management, influenced by public opinion and by the pressing recommendations of cantorial and federal authorities, has perhaps not always shown a stiff enough backbone. Now the Executive Council declares that expenses must be reduced. The state railways have not the safety-valve which is companies had, which, when net earnings fell off, could reduce their dividends. The state railways absolutely must pay interest regularly on the $300,000,000 they have paid for the roads, and a sinking fund to retire their debt within 60 years. This is the explanation of the reduction in the number of trains and other measures of economy. The council, however, rejects the proposal to advance freight rates, which are already higher in Switzerland than in adjacent countries.

MEETING OF THE INTERNATIONAL RAILWAY FUEL ASSOCIATION.

The first annual meeting of the International Railway Fuel Association was held in the Auditorium Hotel, Chicago, June 21 to 23. The membership is around 200 and the average attendance at the convention was 117. President Eugene McAuliffe (Rock Island-Frisco) was in the chair, and in his address said:

"The railway officers of the United States, Canada and Mexico have become awake to the importance of the fuel question, which represents an item of approximately $190,000,000 a year at the mines in the United States alone. We have no very recent figures for the Dominion of Canada and Mexico. I think it is safe to add to that amount approximately $90,000,000 to cover the actual expense of conveying the coal from the mines to the point of consumption, and for transferring it from cars to engine tenders, with a further item of expense to cover the accounting and general supervision, which on a great many roads is not charged directly to the cost of locomotive fuel.

"Fuel represents a proposition which has been very much neglected. Whenever the necessity for economy becomes evident, the first men called on to make a reduction are those in charge of maintenance, both mechanical and permanent way; but the fuel bill moves right along. The management of the average railway is never very much surprised when the fuel bill jumps up a few thousand dollars; they look at it as a sort of guess proposition. However, that condition does not obtain to the same extent that it did three or four years ago, and the purpose of organizing this association was to still further increase the interest of railway officials, to the end that the fuel bill of our American railways be reduced.

"We have a number of coal operators as associate members. We also asked the representatives of large engineering firms to join us as associate members. We wish to secure the advice, counsel and assistance of specialists; we want the help of men of trained minds, who are giving their entire time to the working out of the problems incidental to the transpotration, handling and economic use of fuel.

"The coal producer is a factor in our economy. The railway officer who does not recognize that fact is remiss in his duty to the company that employs him. Possibly to-day coal produces the largest volume of tonnage that the railways move, at least the largest volume which is widely scattered. It is very necessary that the coal producer and the coal buyer work together, and I believe that the railway coal buyer can be of material assistance to the coal producer in working out the problems that confront the men who are mining coal for industrial purposes.

"There are a great many problems that the coal operator has to meet at certain seasons and in certain localities. A single grade of coal is in active demand; no one wants the remaining grades. We have recently heard a great deal about the conservation of our natural resources. There is not much consistency in exploiting the conservation of coal when operators at certain seasons are compelled to dump hundreds of thousands of tons of screenings or fine coal on the ground, because the trade at that particular season does not want that particular grade of coal. I think that that problem can be met to a certain extent by railways purchasing coal. I believe that we should confer very closely with the coal producer, to the end that in some instances a compromise grade, possibly, somewhere between lump and mine-run may be purchased, and burned on our locomotives, preventing the necessity for the operator dumping fine coal on the ground, which in the majority of cases is practically lost, for the revenue that he derives from the sale of that subsequently picked up barely offsets the expense of throwing it down and picking it up. You all know that coal stored on the ground deteriorates very rapidly.

"A further advantageous disposition of fine coal can be made by the extension of the briquetting industry. The efforts that have been made in the briquetting line in the United States up to this time have been rather of an experimental character. However, within the last three or four years I feel that this industry has been carried beyond the experimental stage. Machines are now being manufactured for successfully briquetting fine coal."

The officers for the ensuing year are: President, Eugene McAuliffe (R. I.-Frisco); first vice-president, W. C. Hayes (Erie); second vice-president, J. H. Hibben (M., K. & T.); secretary, D. B. Sebastian (C. & E. I. and E. & T. H.); treasurer, J. McManamy (Pere Marq.); executive committee, two years, T. E. Adams (St. L. & S. W.), T. P. Edgar (C. H. & D.), and R. Emerson (L. V.); one year, D. Meadows (M. C.), G. M. Carpenter (N. C. & St. L.), and J. W. Hardy (R. I.). The next meeting will be held in Chicago between May 15 and June 15, 1910.

ELECTRIFICATION OF THE STATE RAILWAYS OF ITALY.*

The total mileage of Italian State Railways operated by electricity for suburban and local traffic up to December, 1908, was 112. For 1902 to 1912 there will not be more than 186 miles electrified, or an average of less than 18 miles per year. These are the maximum figures determined in the budget of 1906. The programme includes the electrifying of the 16 miles from Gallarate, on the Milan-Ceresio suburban line, to Arona Junction, on the new single-track railway which, running along the west shore of Lake Maggiore, connects with the Simplon line at Domodossola.

Northwards from Gallarate, the only other electrical project is from Gallarate to Laveno, a distance of about 20 miles—not in the Simplon direction, but on the opposite, or east, side of the Lake Maggiore, and therefore in the direction of Bellinzona and the St. Gotthard Railway. These extensions of electrical traction are, therefore, part of the Milan suburban district electrical system, and totally distinct from the main line system worked by locomotives from Milan to the southern mouth of the Simplon tunnel. From Arona to Domodossola there is no scheme for electrical traction, and yet the distance is important—35 miles. But north of Domodossola it is proposed to electrify the 11 miles up to the mouth of the great tunnel at Iselle, the ruling gradient being 2½ per cent. This portion of the international route is on Italian soil, but is wholly operated by the Bundesbahnen—Swiss Federal—compound locomotives. As to when the electrical traction now employed in the tunnel will be extended down to Domodossola, even the Swiss General Direction cannot at present say anything positive.

The programme of 1906 comprised one other main line electrification, Mount Cenis tunnel, which is particularly difficult to ventilate. So far no trains have been operated electrically; the installations having not yet been begun.

Of secondary lines in Northern Italy the programme of electrification of 1906 to 1911 comprises in all 32 miles, chiefly in tunneled lines of heavy gradient under the Ligurian Apennine, where the smoke difficulty has to be overcome. One application is the Savona-San Giuseppe di Cairo section, which, leaving the Mediterranean littoral at Savona, proceeds to Cuneo, while a branch runs to Acqui. The length of the line to be equipped is about 12 miles. Like the Milan-Porto Cerisio line, this is to derive power from steam engines, the contracts for which were being arranged during the past year—1908—while plans were prepared for the central power station at Vado Ligure.

Another part of this total of 32 miles is comprised in the proposed electrification of the Genoa tunnels, seven miles, while the remainder—12 miles—belongs to the Genoa-Parco Campasso to Busalla section on the old Giovi line. This application is approaching completion, and it is the first line

*Abstract of an article in *The* (London) *Engineer*.

in Italy on which electrical traction will be employed under conditions closely approaching main line traffic—at least in respect of freight service.

In the north of Italy the only electrical applications yet unmentioned are those of the Milan district suburban extensions between Milan, Lecco, Usmate, Calolzio and Ponte San Pietro, in all 58.5 miles. Up to the present on the Lecco-Calolzio section the supporting posts for the conductor lines have been erected to experiment with a type of equipment proposed by the firms of Westinghouse and Ganz. In the meantime arrangements were being made, up to the end of the past year, to enlarge the hydraulic power station of Morbegno so as more completely to utilize the power obtainable from the Adda river, with a view to extending electrical traction to Milan and to Bergamo. The power thus obtained is to be available by the State Railways near Usmate.

The Naples-Salerno section, with the branch to Torre Annunziata and Castellammare, 31.6 miles, is to be operated by electricity derived partly from water power installations and partly from steam plants, the latter, near Torre Annunziata, to serve as reserve for the hydro-electric station of the Tusciano. Finally, when the agreements can be drawn up and the arrangements made for the installation of the electrical conductors—matters which present difficulties and conditions of no light order—the State Railways Administration, with the funds necessary for the work, will provide the plant and order the electrical machinery.

One great installation of electrical traction is approaching termination in the neighborhood of Genoa. From Genoa to Ronco there will be electrical traction on one line with its trains running parallel, and in close proximity to the steam trains on the newer line known as the Succursale, and often in full view of each other. The electric locomotives of Westinghouse type have already been received, and as the delivery continues these will be sent for a trial period of working on the Tellina Valley Railway. During the past year the installations were so far advanced as to allow of the building in of the steam boilers, which will furnish the power, and the erection of the Westinghouse turbo-generators. The present installation is an amplification of the original project to electrify the six miles of line from Pontedecimo at the foot of the incline to Busalla at the summit. Now another six miles have been added so as to carry the system as far as the sorting sidings of the port at Parco di Campasso.

The two lines, the steam and the electric, separate at Rivarola, near Genoa, and meet again at Ronco Station at the top of the incline. In case of the electric plant breaking down temporarily, such as has occurred even with the Simplon tunnel line, the traffic would simply be diverted for a time to the new line.

The total length of the line now electrified between Genoa-Campasso—and connected to the San Limbania quay at the port—and Busalla station, is 12½ miles. Westinghouse steam turbine sets are installed—two at present, to be followed later with a third set when the Genoa underground lines are electrified. Each set will be run by seven Babcock & Wilcox water-tube boilers, one of these boilers being held in reserve, each boiler having 4,024 sq. ft. water heating surface besides the steam heating surface of the superheaters, which, with the working pressure of 235.2 lbs. per sq. in., will raise the temperature to 594 deg. F. Green's economizers are provided also, these having automatic scrapers run by electric motors.

The central station is on the west side of the city and close to the port. The turbines are each direct-connected to alternators, generating three-phase current of 15 periods, with an effective tension of 13,000 volts. At 900 revolutions per minute the power developed will be 5,000 kilowatts effective measured at the switchboard, or with a 25 per cent. overload, 6,250 kilowatts for short periods, or it may attain 10,000 kilowatts for five minutes or so. An exciter mounted on the shaft of each generator will produce 50-volt direct-current. The switchboard is of the relay control type, with two sets of bus bars, each one of which can be connected in circuit with the generators by means of oil-break switches. Energy regenerated as the trains descend the short steep incline of the Giovi will be absorbed up to a maximum of 4,000 kilowatts by means of an automatic rheostat, switched in by current inversion relays inserted in the circuit of the generators.

The electric locomotives are remarkable for their great weight. They have ten coupled wheels 42 in. in diameter, and each locomotive is fitted with two motors of 800 h.p. rated capacity. These are geared to the wheels by a system of rods and cranks. The two motors are of the three-phase type and have eight poles. With a frequency of 15 periods, they are calculated to run at a speed corresponding to 28 miles per hour working in parallel, or 14½ miles per hour coupled in series.

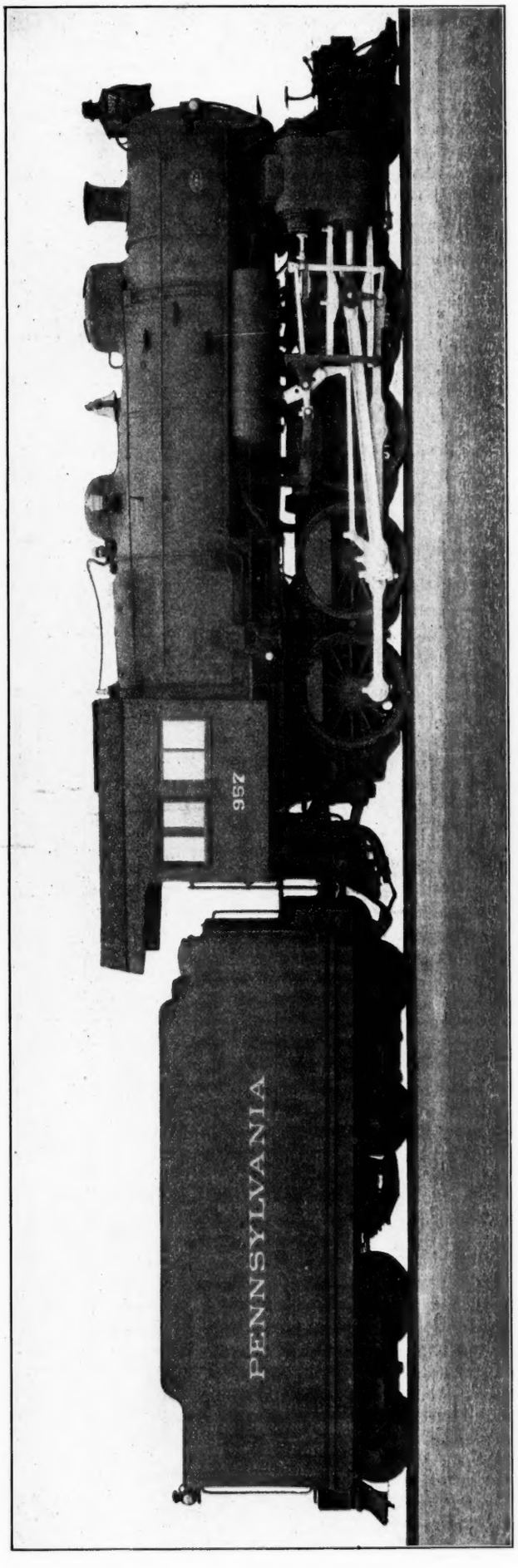
For the controlling apparatus the principle has been adopted of removing from the hands of the motorman all high-tension gear. Pneumatic controlling apparatus similar to that employed on the Tellina Vale Railway is employed with modifications. In the Giovi tractors the compressed air maintained at nearly constant pressure in a single train pipe will act usually through the intermediary of pistons, on all the different apparatus employed in the operation of the train, as trolleys, interrupters, controllers, rheostats, etc. Admission, discharge and other operations in compressed air working are effected by electro-magnetic control with alternating monophase current.

In service on the Giovi line, it is stated that by means of two locomotives, one in front of the train and one behind it, it will be possible to move a train of 20 cars of the average weight of 20 tons—that is a load of 400 tons—at a constant speed of 28 miles per hour.

The electric locomotives are of the same weight as the ten-coupled steam locomotives which have been for some time employed on the parallel Ronco line in working the heaviest freight traffic, the average train load being 270 tons per locomotive. This line is, however, much less steep than the Giovi. However, on the 16 miles length of 2½ per cent. grade of the Poretta route between Florence and Bologna, where a difference of level of 1,830 ft. is met, together with very numerous curves and counter curves of only 684 ft. radius, with a large portion of the line in tunnel. The new steam locomotives, "class 470," maintain a speed of 18 miles per hour with a load of 230 tons per locomotive, and consume from 3.56 lbs. to 4.8 lbs. of coal per i.h.p., or 14.8 lbs. to 18.6 lbs. of coal per 100 ton-miles virtual run. There is an interesting similarity of gradient and speed-load conditions on the two lines, but the electric plant has the important advantage of returning power to the mains on the down hill runs, whereas there is no such saving in connection with the steam locomotives.

On the Giovi line, divided into three block sections, it is expected to be able to haul 1,008 cars per day, working 18 hours daily and allowing an interval of 15 minutes between each train; or of 1,120 cars in working 20 hours daily, this latter only leaving four hours for tunnel inspection. Moreover, it is hoped, when occasion afterwards requires, to be able to reduce the train intervals to ten minutes.

The Uganda railway earned gross about 4 per cent. less in the year to March 31, 1908, than in the previous year, and net 15 per cent. less. This is attributed to the effects of a drouth, which will be likely to last for still another year. More than one-third of the value of the export traffic came from German East Africa, brought by steamers on Lake Victoria Nyanza, 36 per cent. from Uganda (across the lake from the railway terminus; for the Uganda railway is not in Uganda), and only 30 per cent. from the country through which the railway passes—British East Africa, where hunting is now going on. There is now talk of extending the railway westward to the Albert Nyanza. The net earnings last year were about 11 per cent. on the cost of the road.

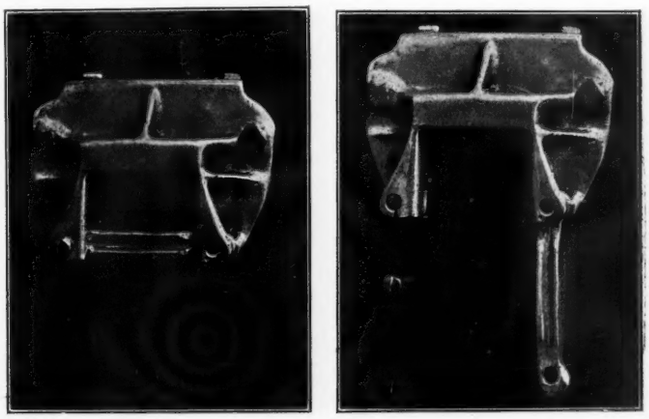


Consolidation Locomotive for the Pennsylvania, Built at the Juniata Shops.

COUPLER CARRY-IRON.

The usual design of a coupler carry-iron is secured to the striking plate or end sill by two or more bolts. The constant movement of the coupler makes it almost impossible to keep the nuts on these bolts tight, even by use of lock nuts. In a great many cases where it is desired to drop the coupler, it is found necessary to cut the bolts on account of the rusty nuts. To overcome these difficulties, the Flory coupler carry-iron here shown was designed. The design briefly consists of a cast steel carry-iron, having a trunnion on one end and a hole through the other. The trunnion rests in a pocket made to receive it in the striking plate and the other end is held up by a pin, 1⅜ in. in diameter, passing through the holes in the carry-iron and the striking plate. The pin is held in position by a cotter pin. There are no bolts or nuts to get loose and all that is necessary to do in order to drop the coupler is to remove the cotter and withdraw the pin. The carry-iron then drops at one end but hangs in place at the other by the trunnion. This operation can be done in less than a minute, while with the ordinary design it takes from 15 minutes to an hour, depending on the number of bolts.

The carry-iron can be used with any kind of end construction. The trunnion and hole in the carry-iron are offset ⅜-in. from its center, thus permitting the carry-iron to be reversed and raise the height of the coupler by that distance; the



Coupler Carry-Iron.

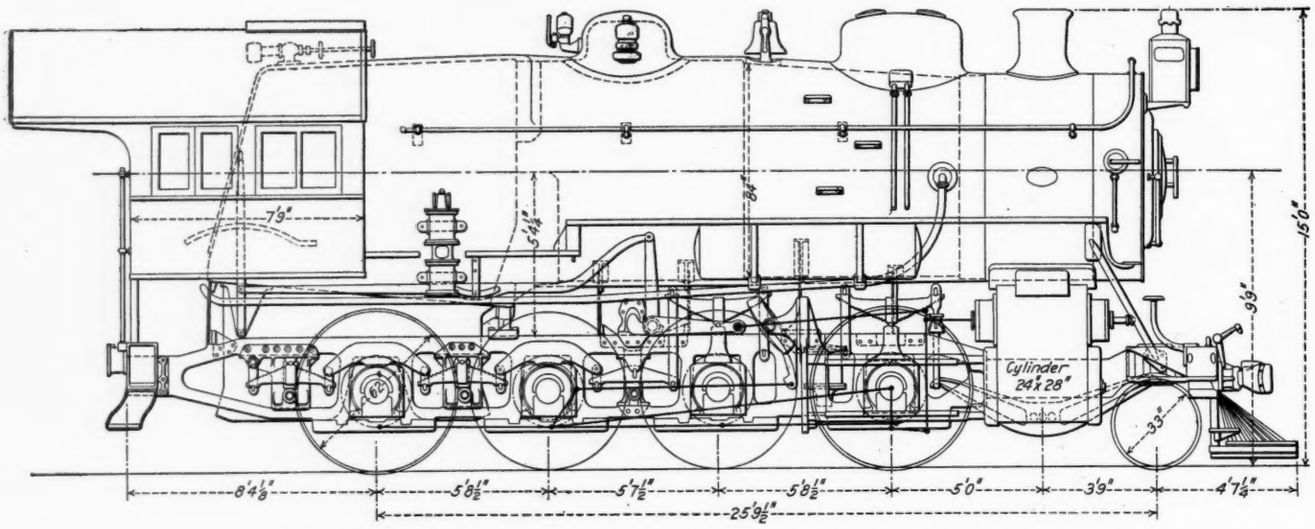
space over the coupler shank at the striking plate being increased to ¾ in. for that purpose. This is very advantageous when a car is low at the coupler and it is desired to raise it quickly. A considerable number of these are in use on a number of roads and are said to be giving entire satisfaction. The carry-iron was designed and patented by B. P. Flory, Superintendent Motive Power, of the New York, Ontario & Western.

The Commonwealth Steel Company, St. Louis, Mo., is handling this device.

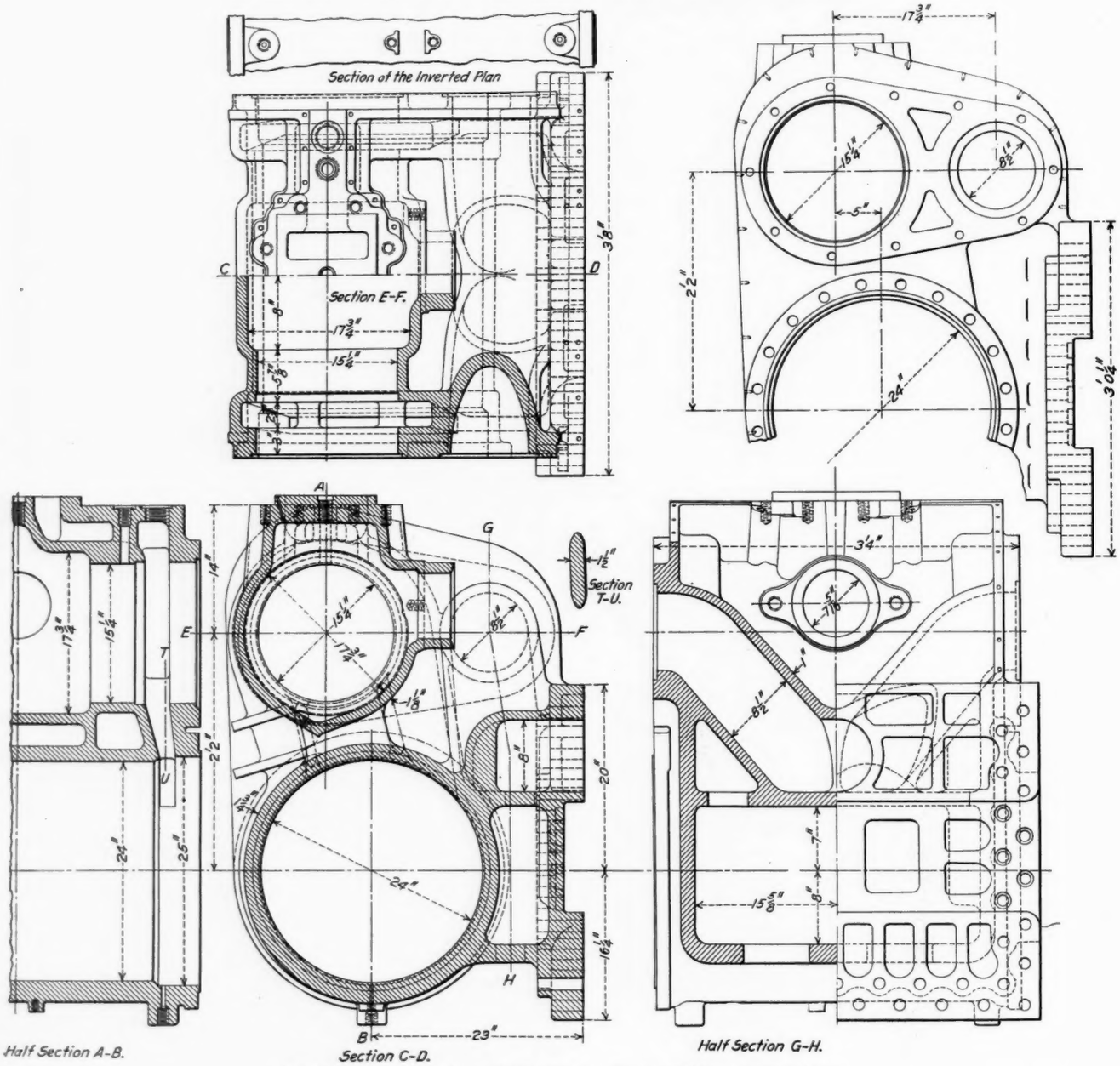
CONSOLIDATION LOCOMOTIVES FOR THE PENNSYLVANIA.

The consolidation locomotives, class H-8b, recently built by the Pennsylvania at the Juniata shops, are interesting on account of their great weight and high tractive power as well as the excellent designs of the details for lateral bracing of the frames and the supports of the Walschaerts valve gear. It is probable that in these engines the Pennsylvania has reached the maximum weight on drivers which will be used by that company in simple locomotives for regular road service, and that when greater power is required resort will be made to the articulated type.

The cylinders are 24 in. x 28 in., driving wheels 62 in. in diameter, and boiler pressure 205 lbs. With four-fifths boiler



General Elevation of Pennsylvania Consolidation Locomotives.

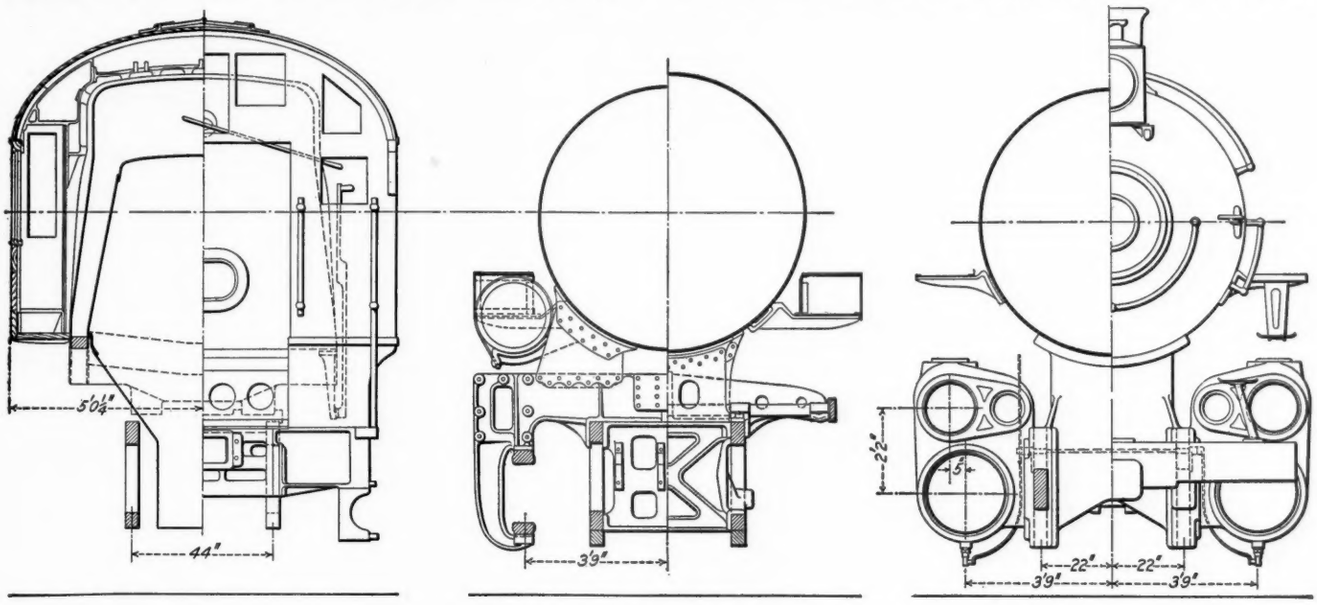


Half Section A-B. Section C-D. Half Section G-H.

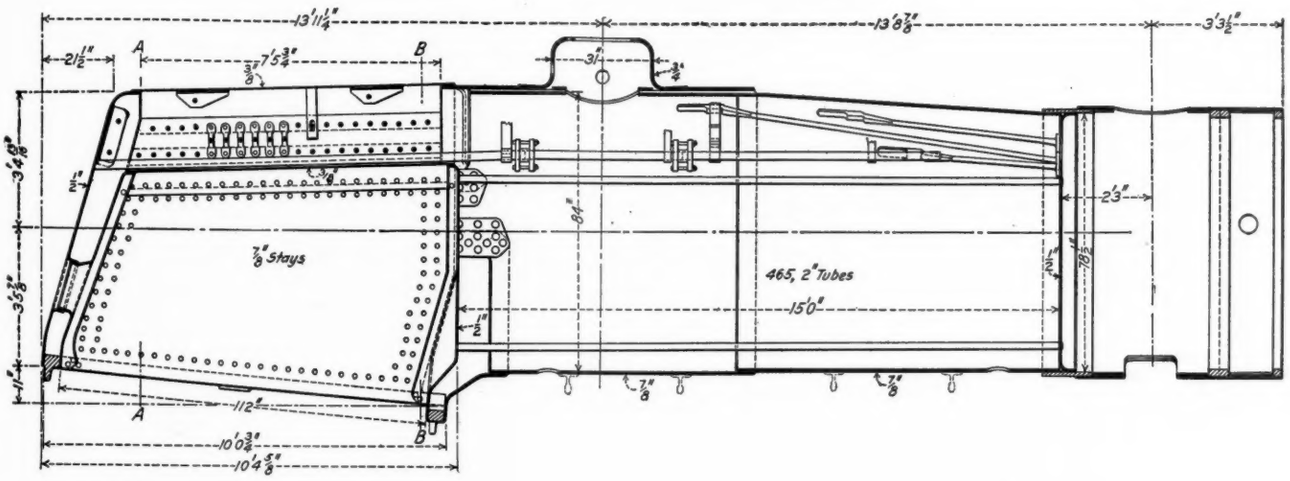
Cylinder Details of Pennsylvania Consolidation Locomotives.

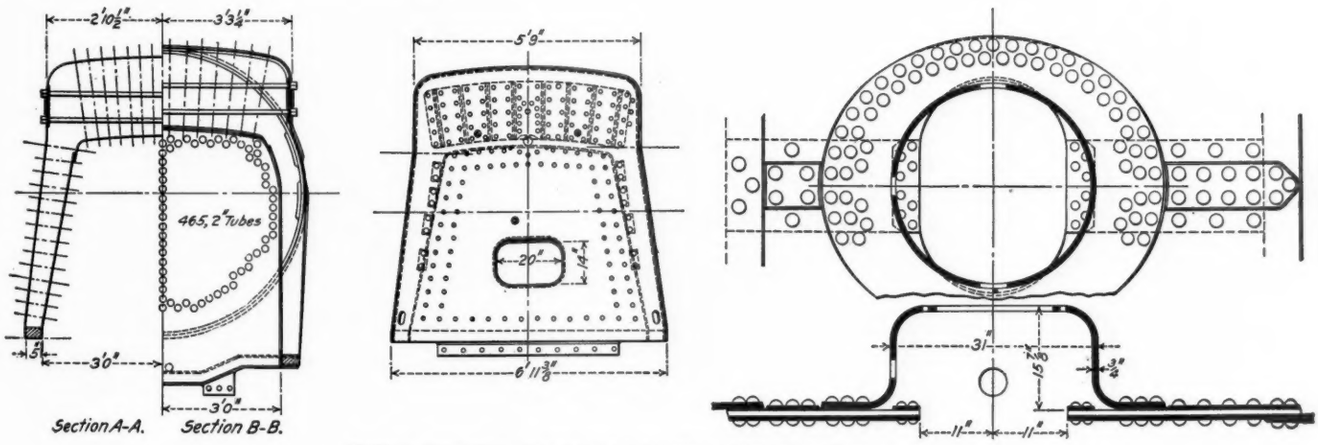
pressure as mean effective pressure, the tractive effort is 42,660 lbs. The weight on drivers is 211,000 lbs. and on trucks 27,333 lbs., total weight of engine being 238,333 lbs. The weight of the engine empty is 212,000 lbs.

The boiler is very large, having a diameter at the front ring of 78½ in. outside, and tapering up to the wagon top with a diameter of 85¾ in. outside. The shell sheets are ⅞ in. thick, with 1 3/16-in. rivets, and the outside sheets of the firebox are ⅜ in. thick. The firebox is the standard Belpaire type as used by the Pennsylvania, 72 in. wide and 110¼ in. long, inside. The mud-ring has the unusual width of 5 in. at the sides and ends, and the firebox side sheets have a perfectly straight slope to the crown sheet at the back end, while in front there is a slight curvature at the top. There are 465 2-in. tubes, 15 ft. long. The total heating surface is 3,839 sq. ft., and the great area 55.13 sq. ft. The delivery pipe from the injector is carried on the inside from the back head of the boiler well forward, within about 3 ft. of the



Front and Back Elevations and Sections.

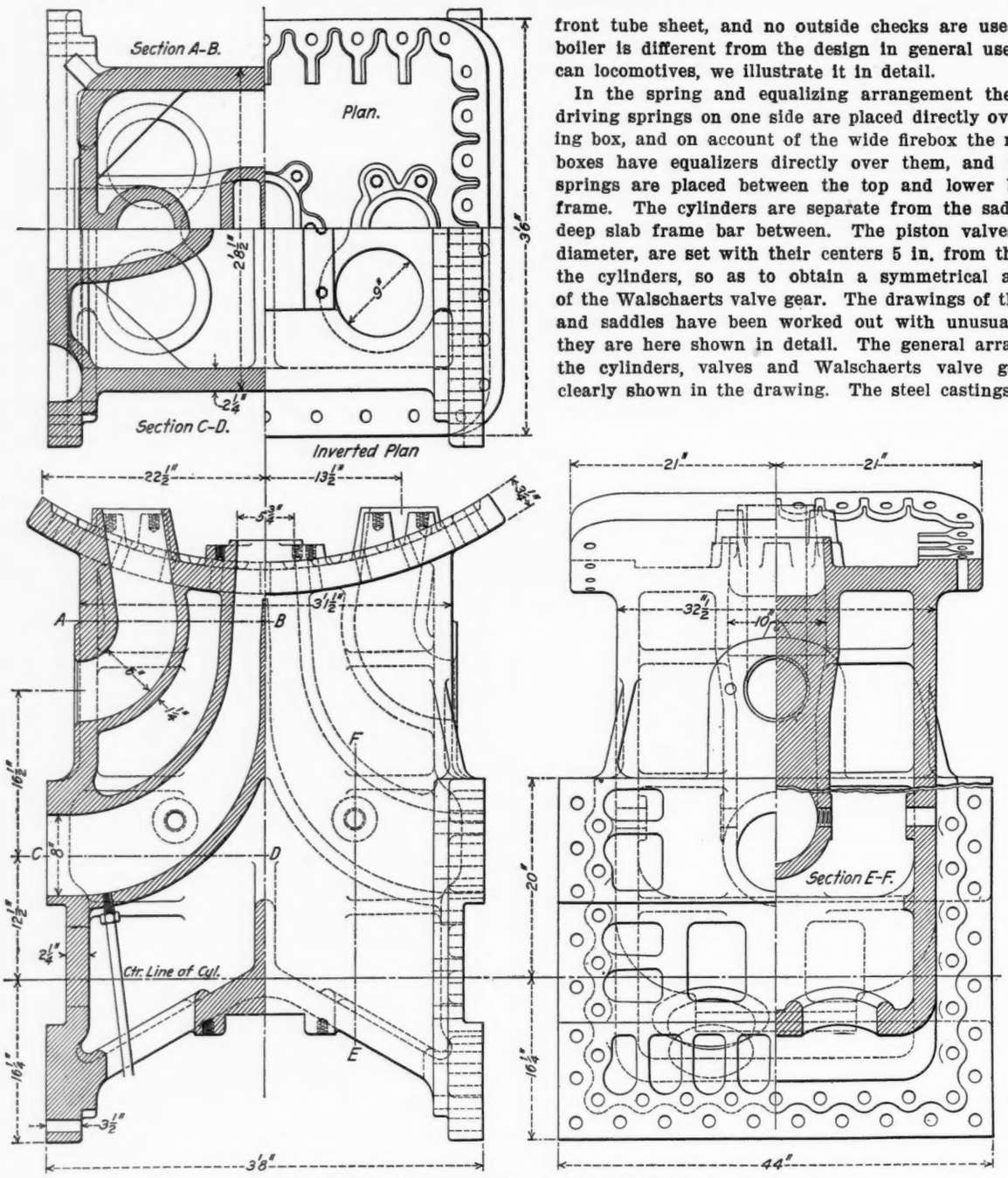




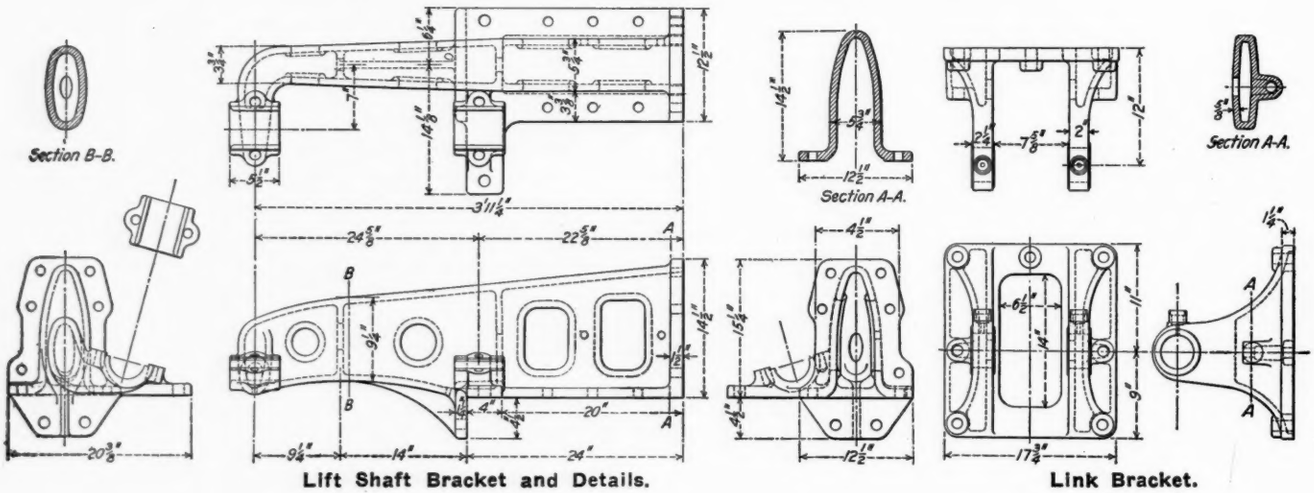
Boiler Details; Pennsylvania Consolidation Locomotives.

front tube sheet, and no outside checks are used. As this boiler is different from the design in general use on American locomotives, we illustrate it in detail.

In the spring and equalizing arrangement the two front driving springs on one side are placed directly over the driving box, and on account of the wide firebox the rear driving boxes have equalizers directly over them, and the driving springs are placed between the top and lower bars of the frame. The cylinders are separate from the saddle, with a deep slab frame bar between. The piston valves, 14 in. in diameter, are set with their centers 5 in. from the center of the cylinders, so as to obtain a symmetrical arrangement of the Walschaerts valve gear. The drawings of the cylinders and saddles have been worked out with unusual care, and they are here shown in detail. The general arrangement of the cylinders, valves and Walschaerts valve gear is also clearly shown in the drawing. The steel castings, which are



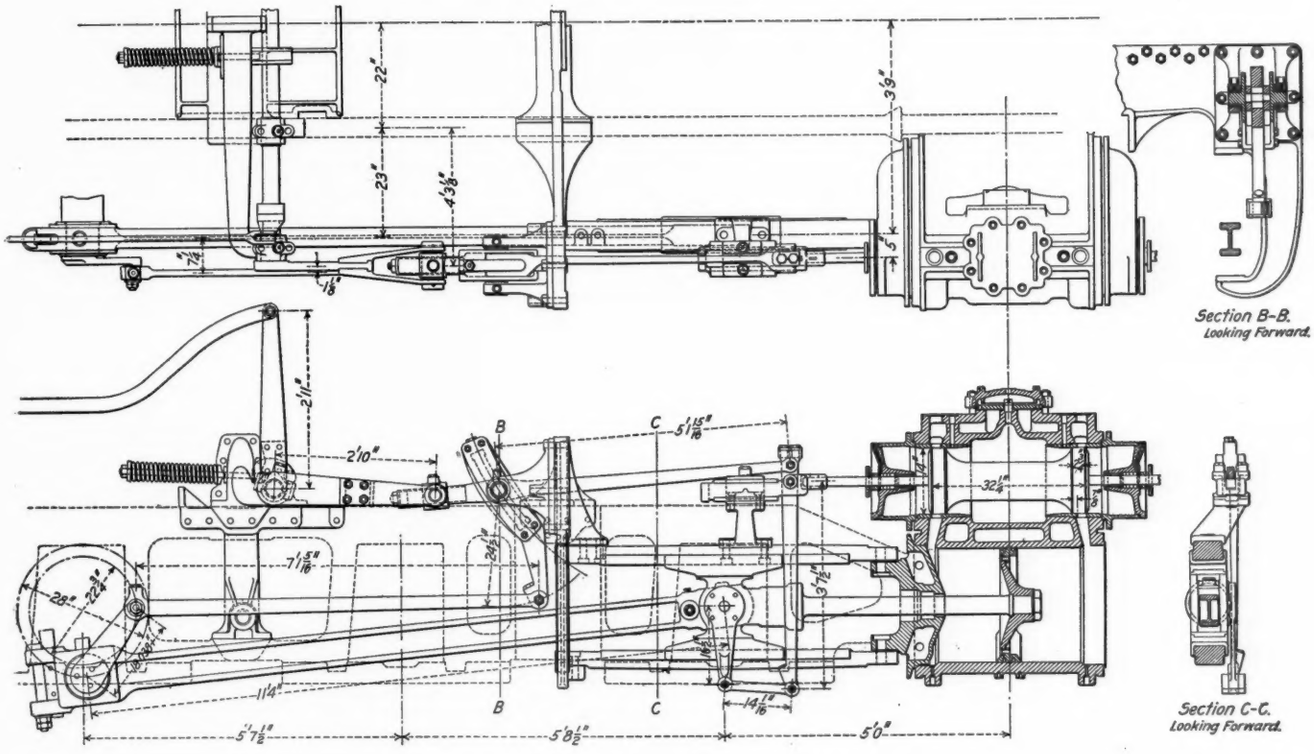
Cylinder Details; Pennsylvania Consolidation Locomotives.



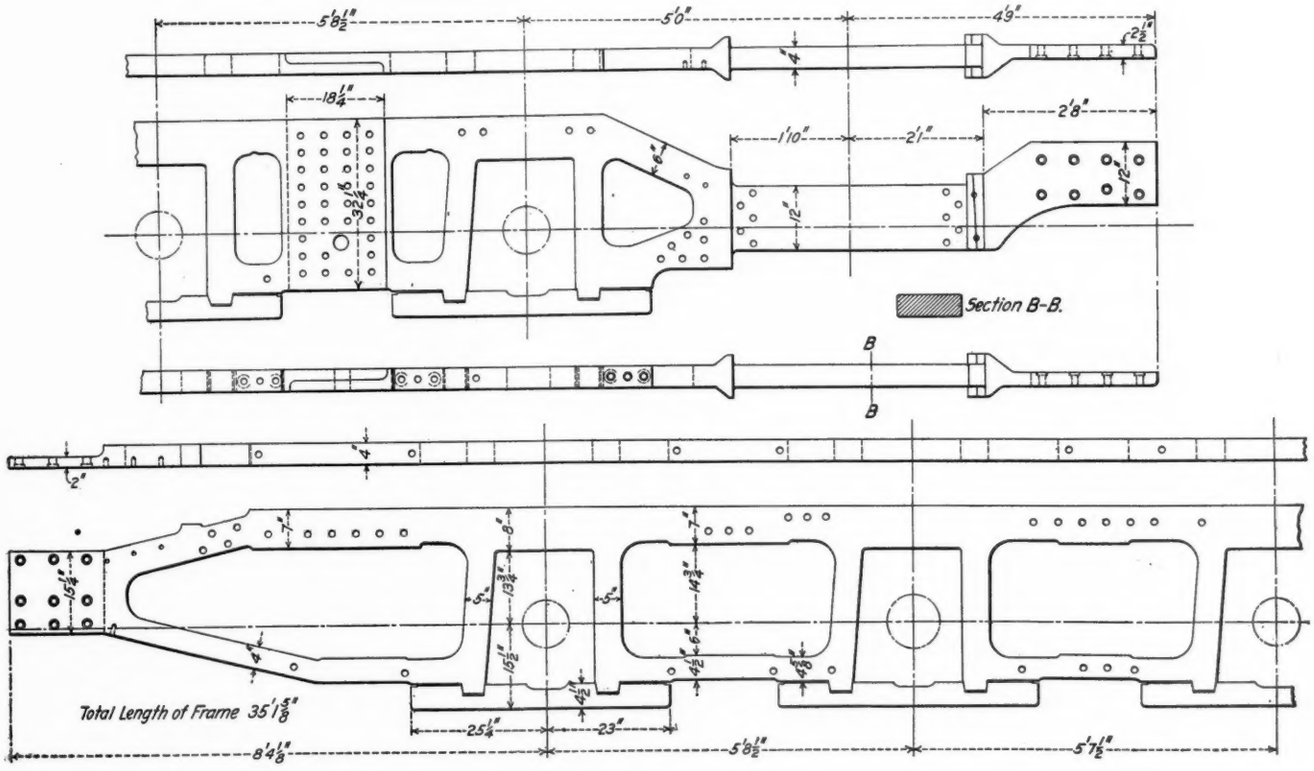
Lift Shaft Bracket and Details.

Link Bracket.

employed for the support of the fixed link, the guide yoke, and for the outer end of the lift shaft bearing, are good examples of excellent design. Steel castings are also liberally employed for the lateral bracing of the frames. The frames are forged wrought iron and are unusually heavy. While the normal width is only 4 in., the depth over the driving boxes is 8 in.; between the boxes 7 in., and the portion back of the front driver at the frame joint is 32¼ in. deep, while that between the cylinders and the saddle is 4 in. wide and 12 in. deep. Most of the corners throughout the frame are rounded off to a ⅜-in. radius. As it was not necessary to economize in the weight, every portion which would contribute to strength has been made unusually heavy. This is seen not only in the frame, but in the steel castings used for the front



General Arrangement of Walschaerts Valve Gear.



Elevation and Plans of Frame; Pennsylvania Consolidation Locomotives.

bolster and the rear attachment for the engine drawbar. The leading dimensions, weights and ratios are as follows:

Cylinders	24 in. x 28 in.
Boiler, diameter first ring	78½ "
Steam pressure	205 lbs.
Firebox, length	110¼ in.
" width	72 "
" thickness, sides	⅜ "
Tubes, number	465
" diameter	2 in.
" length	15 ft.
Heating surface, firebox	187 sq. ft.
" " tubes	3,652 "
" " total	3,839 "
Grate area	55.13"
Valves, type	Piston
" diameter	14 in.
" maximum travel	6 "
" steam lap	⅞ "
Wheels, diameter, driving	62 "
Wheels, diameter, truck	33 "
Journals, driving, main	10½ in. x 13 in.
" others	9½ " x 13 "
" truck	5½ " x 10 "
" tender	5½ " x 10 "
Wheel base, driving	17 ft. ½"
Wheel base, total engine	25 " 9½"
Weight on drivers	211,000 lbs.
" " front truck	27,333 "
" total engine	238,333 "
" engine and tender	396,333 "
Water capacity	7,000 gals.
Coal capacity	13.5 tons
Tractive effort	42,660lbs.

Weight on drivers / Tractive effort	= 4.94
Total weight / Tractive effort	= 5.58
Weight on drivers / Total weight	= 88.53*
Tractive effort x diameter drivers / Heating surface	= 688.96
Heating surface / Grate area	= 69.63
Firebox heating surface / Total heating surface	= 4.87*
Weight on drivers / Heating surface	= 54.96
Total weight / Heating surface	= 62.08
Displacement, 2 cylinders, cu. ft.	= 14.60
Heating surface / Displacement, 2 cylinders	= 262.94
Grate area / Displacement, 2 cylinders	= 3.77

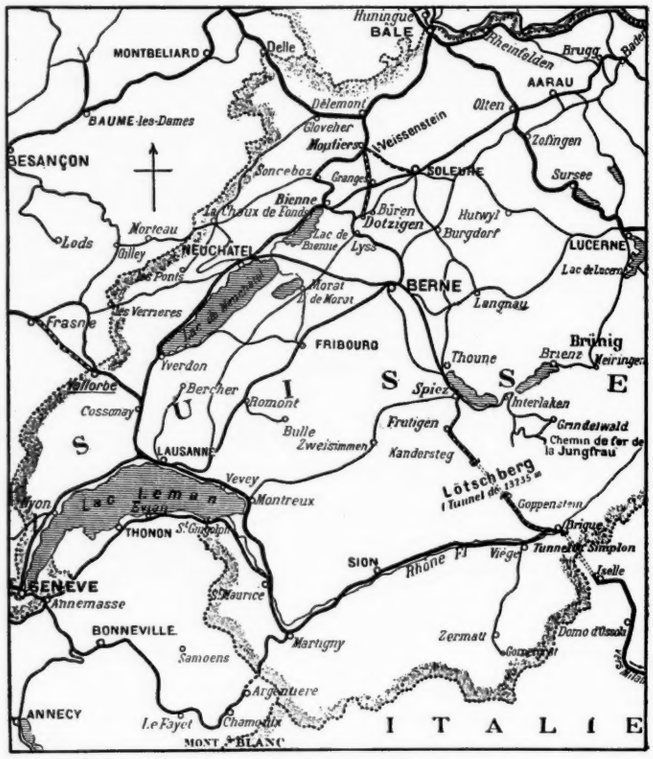
*Per cent.

THE LOETSCHBERG TUNNEL.

BY H. PRIME KIEFFER.

The idea of building a tunnel under the Bernese Alps was in the minds of certain French promoters long before the Simplon tunnel was projected. It was not, however, until the latter tunnel was finished and the railways of Europe realized the wonderful advantages which that route possesses that the Loetschberg was finally begun. The actual work of driving the Loetschberg tunnel was started in the latter part of 1906, but the project itself had been considered by a number of French capitalists and contractors for about 20 years previous to that time. In August, 1906, a contract was signed with F. Hittmann and G. Greulich. The time allowed for completion is 5 years, and the projectors have a 99-year franchise. It was first decided to have but a single track, but a year after work began it was seen that a double track was imperative. The original contract included the actual piercing of the tunnel and the approaches to it on either side of the Alps, from Brigue on the south and Frutigen on the north, and the connection to existing railways at these points. Hand methods were employed at first but by March 1, 1907, complete mechanical equipment had been installed and the real work begun.

The tunnel will connect with the road through the Simplon tunnel and will form part of an important route to Italy. The western portion of Switzerland is at present served via the valley of the Rhone. The new route will, therefore, put Berne

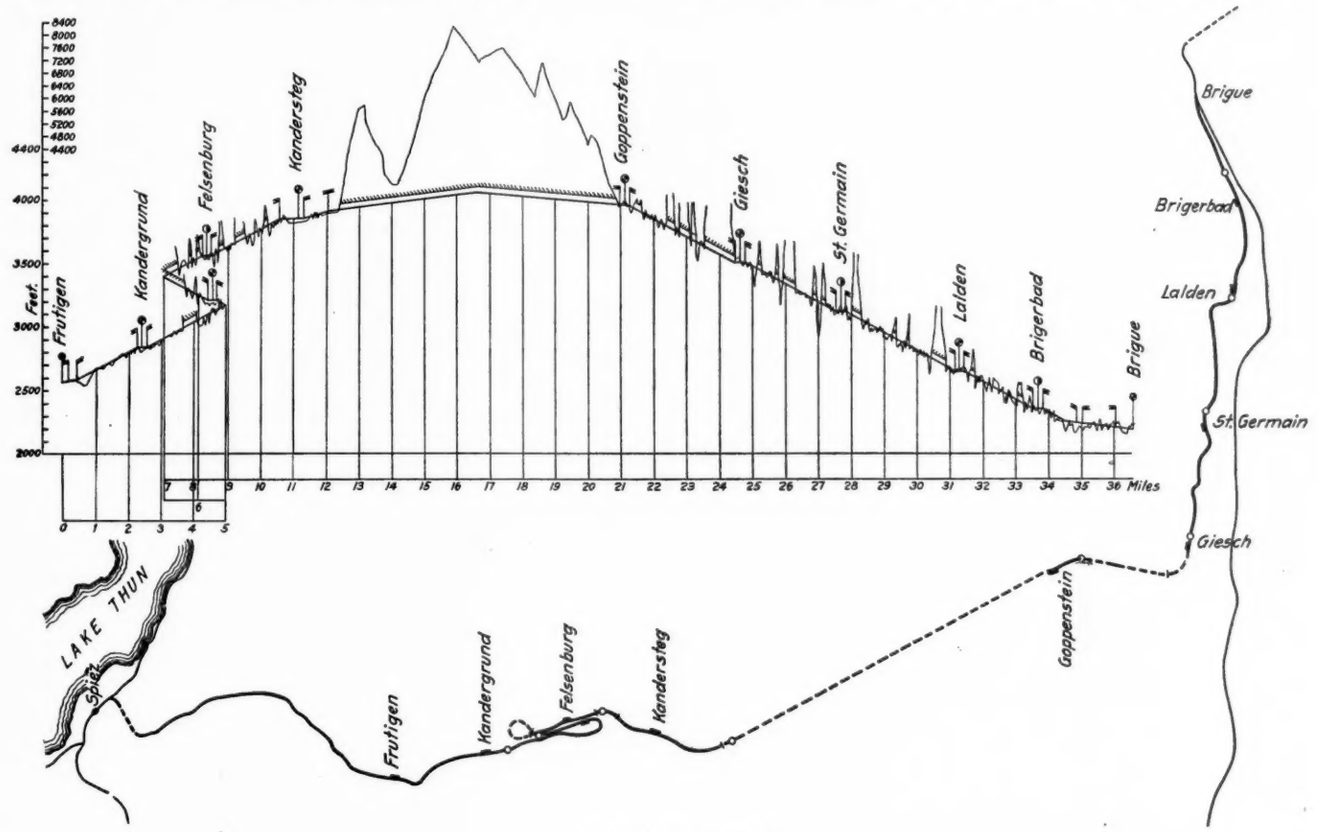


Location of Loetschberg Tunnel.

and Basle, via the Bernese Alps Railway, in direct communication with the Italian railways, obviating long detours up the Rhone valley or through the St. Gothard tunnel to the east. It is estimated that the increased traffic which will be thrown to the Simplon tunnel will tax the ability of that tunnel to its utmost. The new link will consist of a railway from Frutigen to Brigue, both in Switzerland, the latter station being just at the northern end of the Simplon. This line is 36 miles long, and in all of it there is a great amount of tunneling, in addition to the main tunnel, which will be 8½ miles long.

After leaving Frutigen, which is 2,560 feet above sea level and about 34 miles south-southwest of Berne, the line continues along the eastern side of the valley of the Kander river. Between the 4th and 8th miles, as shown in the profile, after leaving Frutigen, the line climbs up the valley side by double bend and spiral tunnel, and at about the 12th mile reaches the entrance of the Loetschberg tunnel. The gradient of the northern approach is for the most part 2.7 per cent., several short tunnels and a large number of bridges being necessary on this section. The entrance to the main tunnel is 3,935 ft. above sea level. The highest point of the line is in the tunnel about 3.72 miles from the north entrance, where an elevation of 4,084 ft. is reached. The gradient on this portion of the tunnel is 0.7 per cent. After passing the summit the gradient changes to a falling one of 0.4 per cent. The southern portal of the tunnel is at Goppenstein, at an elevation of 4,000 feet, whence the line descends the Loetschen valley. Just before reaching Giesch the line makes a right-angle bend towards the east, and turns up the valley of the Rhone, winding

along its northern side, until it finally crosses the river and joins the Rhone valley line of the Chemins de Fer Federaux from Lausanne to the Simplon tunnel, at Brigue. For the most part the descent from Goppenstein to Brigue is on gradients of from 2.7 per cent. to 1 per cent. From Goppenstein to Brigue there are 37 tunnels and 12 large bridges. Brigue is 7½ miles from Berne, and is 2,234 ft. above the sea.



Loetschberg Tunnel.

The general offices of the construction engineers are at Berne. The line from Frutigen to Berne has been divided into four construction divisions, located as follows:

First Division.—Frutigen, in charge of the north approach.

Second Division—Kantersteg, in charge of the actual tunnel work of the north side.

Third Division—Goppenstein, in charge of the actual tunnel work of the south side.

Fourth Division—Naters (across the river Rhone from the town of Brigue), in charge of the south approach. (See map.)

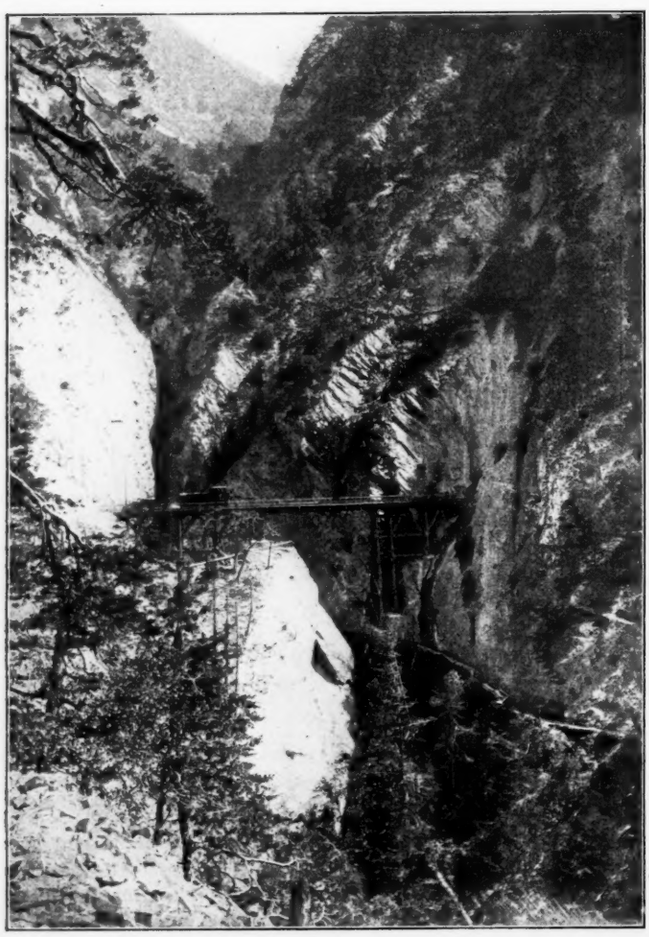
These divisions each have a separate installation of stores and tools with which to operate. At Frutigen are complete stores of coal, cement, oil and foodstuffs, as well as a machine shop, repair shop and forge and locomotive sheds. All machines and tools are electrically operated, current being supplied from a central station at Spiez, at 15,000 volts and reduced to 250 volts. The division between Frutigen and Kantersteg is 8½ miles long and brings the line to the northern entrance of the main tunnel. At the latter station the installations include a transformer station for reducing the 15,000 volt current supply to 125 volts for lighting and to 500 volts for driving purposes. Near the transformer station are installed four air-compressors, two of which, each of 400 h. p. capacity, supply air at 142.2 lbs. pressure for machine and drill working, while the other two, of 250 h. p. each, supply air at a pressure of 1,704 lbs. for the locomotives. Electrically-driven centrifugal pumps and ventilating fans are likewise installed at this point, as well as shops for the repair and upkeep of the machinery and other plant; also explosives, and dwellings for the workmen.

Bridge Built on Grade and Spiral.

The installation at Goppenstein, at the south entrance of the tunnel, is similar to that at Kantersteg, three-phase current being supplied at 5,000 volts from a power station on the river Loetschen. The voltage of the supply is shortly to be raised to 15,000, to be transformed down to 500 for power purposes, and 125 for lighting. The accommodations for the workmen here are better than at Kantersteg, as it is an entirely new town. It has a hotel, restaurant, postoffice, school, etc. Formerly all supplies were transported by mule teams from the railway station at Giesch, but for some time the construction railway from Naters to Goppenstein has been in operation and the older method is no longer used. At Brigue the plant is similar to that laid down at Frutigen, single-phase current at 250 volts being supplied by the local Societe d'Electricite de Brigue-Naters.

At either end of the main tunnel the route will be single

track, but the tunnel itself will accommodate a single track line. Concrete lining 1 ft. 6 in. thick is being placed as rapidly as the construction allows. The extreme internal width inside this lining is to be 26 ft. 3 in. The central portion of the arch will be semi-circular, with a radius of 13 ft. 1½ in. The height from the rail level to the center of the roof arch is 20 ft. A drain 2 ft. square is at the base of the center of the tunnel. A secondary tunnel is now being built immediately adjacent to the west wall for ventilation. It will extend the entire length



Gorge Between Two Tunnels.

of the main bore. It will be rectangular in shape, diminishing in size from the ends to the middle, and will have openings to the tunnel proper at frequent intervals. There are about 45 other tunnels along the construction railways, but they are all small bore and single track.

The dump cars, as well as the workmen's cars, are handled by small compressed air locomotives. The construction lines leading from Brigue and Kantersteg to the tunnel portals are of 19-in. gauge, and are worked in the open by small four-coupled and eight-coupled steam locomotives.

There is much American plant in operation. The plant employed in the driving of the main tunnel includes compressed air drills of several types. Undoubtedly the experience gained in the driving of the Simplon is being used here. The rotary drills used on the Simplon were of European manufacture, while those in use on the Loetschberg are compressed air precussion drills made by the Ingersoll-Rand Co., New York.

An accompanying photograph shows the mounting of the drills. They are set on a drill carriage somewhat similar to the old cumbersome affairs in use in this country in the early stages of tunneling. The drill carriage at the Loetschberg consists, however, simply of a truck with a wheel base of about 6 ft., running on the regular handling track. Mounted on this truck and hinged to swing vertically are two I-beams, set with webs vertical, and reinforced to give them lateral stiffness. On the forward end of each I-beam is mounted a heavy shaft bar set transversely and pivoted to swing in a horizontal plane. On the opposite end of the I-beams are counter-weights. Three drills are mounted on each shaft bar. The compressed air connections to these drills are controlled from the truck and get their supply from one line of hose at the rear of it. When the drills are not in use, the shafts can be swung so that they lie directly over the I-beams, and the truck can then be run anywhere over the heading tracks, occupying no more room in the tunnel than a couple of small cars. Since the drills remain on the carriage at all times, with the air connection of the drills intact, there is slight chance for dirt and grit to work into the movable parts of a drill and impair its efficiency. The drills are of large size, having a piston diameter of 3⅝ in. There are at work at Goppenstein two electrically driven Ingersoll-Rand compressors, one of the cross compound two-stage type, giving a pressure of from 90 to 110 lbs. per square inch at the drills.

In the tunnel proper the ventilation for the benefit of the workmen is very poor. It is supplied by a large electrically-

Side Hill Work.

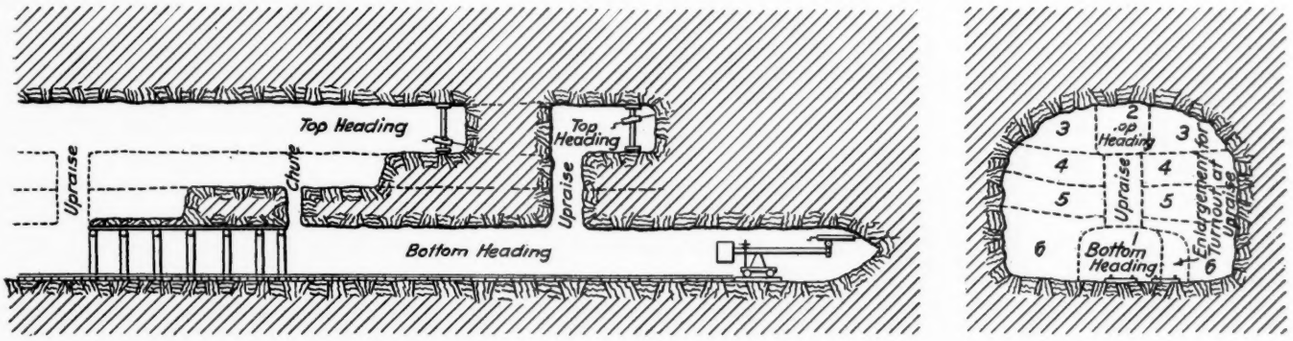
This part of the construction line will eventually be made permanent main line.

driven fan, capable of running either as an exhauster or as a blower. From this fan spiral riveted piping is carried along the bottom heading, the diameter of the pipe varying from 3 ft. at the fan to 1 ft. at the drills.

The lighting is with acetylene lamps carried by workmen. Each man is required to purchase his individual lamp and to keep it in repair. When the lamp is burning it supplies a good flame, and as it is carried in the hand it is always at the needed point. It is not always lighted, however, for the blast-

ing blows out every lamp in the tunnel. With properly placed electric wires, electric lighting would be much better and safer for the workmen, as well as economical in cost. The consumption of oxygen by acetylene lamps is also a factor against their use. There appears to be no doubt but that electric wire conduits could be laid and properly protected. Acetylene lamps could be supplied in addition, as a precaution.

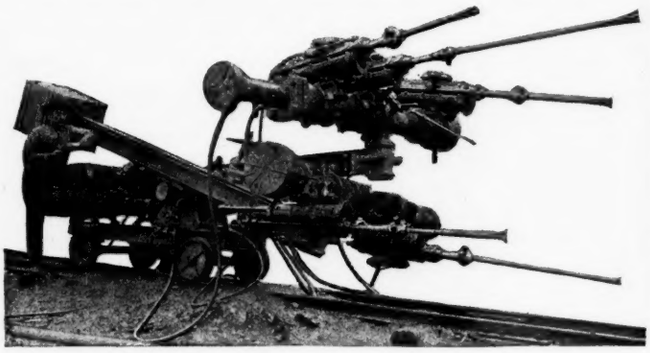
The records of progress made during the driving of the Simplon tunnel were nothing short of marvelous, considering the quality of the rock encountered. In July, 1904, on that work, 685 ft. were driven in one heading, the daily average being over 26 ft. It has been stated that the best American record is now claimed for the Elizabeth Lake tunnel of the Los Angeles aqueduct, where 466 ft. were driven in one heading during October, 1908. At present the work in the south side of the Loetschburg tunnel shows a similar monthly progress to that made on the Simplon.



Method of Driving Loetschberg Tunnel.

The tunnel, as already mentioned, is laid out for a double-track railway, and has a cross-sectional area of about 66 square yards. Owing to the great area of this section, the bottom heading method has been used with success. This bottom heading is from 6 to 8 ft. high and about 8 ft. wide. Upraises are made from the bottom heading every 620 ft., and a smaller top heading is started from these upraises. The work of taking out the rock to the full tunnel section is then continued from these upper headings. Horizontal benches are worked ahead and chutes are opened to the bottom heading for taking out the muck. Heavy timbers, reinforced by steel I-beams, support the upper headings and keep the muck from falling on the workmen below and blocking the service line. The chutes are covered, and are placed directly over the service tracks in the lower heading. The timbering is removed as soon as the top heading is completed, and placed further ahead in the tunnel. Solid concrete is used to bring the tunnel to its exact section, concrete blocks being used where the filling is of large volume. The bottom heading accommodates but a single 30-in. track. There are turnouts at the main upraises, and the headings are widened at these points. The full section excavation can easily keep pace with the main heading. The speed of the completed section has not been as rapid as the headings so far, but it can be increased at any time.

Preparatory to blasting, a heavy sheet steel plate about 7 ft. x 4 ft. is laid down just ahead of the end of the drill carriage and level with the track. When the blasting is completed for one round, an entrance is rapidly made through the muck pile and down to the steel plate; it is made wide enough to allow the arms carrying the drills to get through and into the top of the heading. Drilling is begun, and the dislodged rock is taken out while this work is in progress. Thus no time is lost, except in moving the drill carriage and blasting. Twelve holes are usually taken in each round; they are about 4 ft. deep and 2 in. wide at the base. They are arranged in four horizontal rows, the top and bottom rows being drilled at an angle of about 45 degrees from the horizontal, while the center two are nearly perpendicular to the face. When the round is all drilled, the carriage bearing the six drills is run back to the last turn-out, and the blast fired. The charge is exploded by the fuse-and-cap method the fuses being all ignited at the same time, but by a careful regulation of their lengths they do not all explode at the same instant. Three fuses are placed in each hole in the bottom row, and two in the others; not much trouble has been caused by fuses missing fire. A large amount of powder is used with this method, but



Drill Carriage for Bottom Tunnel Heading.
One drill missing from lower set.

Drill Carriage in Tunnel.
Older model than double carriage shown in other photograph.

it breaks the rock up very evenly and is said to be less severe on the track than when electric firing is used. It is believed, however, that an electrically fired time exploder would meet a wide demand, but so far nothing of the kind has stood the time test, although there are several on the market in this country.

The workmen on the Loetschburg tunnel number at present about 3,500 at both headings; they are mostly Italian laborers from the northern provinces. They work in three eight-hour shifts, and each shift drills about two rounds and shoots twice, making an average of from 6 to 7 ft. per shift, or 18 to 21 ft. per day. A liberal bonus is given to the workmen for speed above a certain rate. The rock encountered in almost the entime distance so far driven has been granite and gneiss.

The work on the north side is now at a standstill as far as the drilling is concerned, owing to the terrible accident which occurred about the middle of March, 1908. At that time the heading had been driven to a distance of about 8,675 feet through limestone, in which work proceeded easily. Granite was encountered, however, about the time the drilling reached the valley of the Gastern, shown in the profile. This small stream crosses the route of the tunnel at about right angles, and the bottom of the stream bed was supposed to be at least 400 ft. above the tunnel; this was solid rock, according to the report of the geological experts. The contractors, F. Hittman and G. Greulich, themselves pointed out that even if there were 600 ft. of material above, a large portion of it probably consisted of moraines and sand. However, on the advice of the geological experts, the work was pushed directly under the stream, and the blasting continued. Immediately after a severe blast, earth, rock, sand and water poured into the tunnel heading, completely filling it and killing some 30 men. It now seems that the moraines extended a great deal deeper than was first supposd by either the experts or the contractors. A hole about 400 ft. in diameter was formed in the bed of the stream and about 4,000 ft. of the tunnel heading was closed. Work was immediately started clearing out, but it will be some time before this work can be brought up to the scene of the accident. At present no scheme has been decided on as to how to proceed with the work at this point, and it is possible that another entrance will be made from the north. A plan is also being entertained to make a bend in the tunnel at this point. Meanwhile, work is progressing rapidly on the south side, and up to January, 1909, about 9,000 ft. had been driven through very hard gneiss. The work was to be finished by September 1, 1911, and to be turned over for operation on March 1, 1912, but it is now doubtful if this can be done.

The undertaking originally involved much preparatory work in providing roads for the transportation of materials, only tortuous mule paths existing in many places. When these were completed the construction lines were built, and their building presented many difficulties. Some examples of this difficult work are shown in the accompanying photographs.

At the last meeting of the directors of the project another $250,000 was voted to electrify the northern approach from Frutigen, in order to experiment and study electric traction. It is, however, doubtful if this work will be carried out on the lines originally designed, owing to the accident in the north side. When completed, the tunnel will be, of course, electrified, and electrical equipment similar to that in use on the Simplon will be installed.

It is regarded as significant, that when the Belgian state railways asked for bids for coal May 12 last, the prices bid were substantially the same as those offered March 3, while previously there had been a reduction at each successive letting. English bids were higher than the Belgian, while some six months ago they secured a large part of the contracts, all indicating that there is a more general demand for coal and that the world is getting on its legs again.

THE STRENGTH OF COMPRESSION MEMBERS.

BY EDWARD GODFREY.

There are two distinct phases to the strength of a compression member. The writer believes that failure to appreciate this has given rise to much misapprehension in treatment of the subject.

Every column of elastic material is a spring or bow as well as a shaft subject to endwise compression. It is the purpose here to show that the strength of a column considered as a spring is independent of the ultimate or elastic strength of the material, and that the formula showing this strength is quite distinct from any formula based on the ultimate or elastic strength of the material. Also it is proposed to show that the Gordon-Rankine formula leads, in some cases, to conclusions that are fraught with danger.

It is further the purpose to show that the straight line formula for the strength of a column can be rationally and theoretically deduced; in fact, that but one simple and natural postulate or assumption in a completely theoretical treatment will result in a formula whose locus is practically identical with the "empirical" column formula deduced from the results of tests.

In Fig. 1 a pin-ended column is represented as a bow or a spring with a deflection at the middle of its length equal to $n\ l$, assumed to be a constant fraction of the length; the curve of the bow is a parabola. Since the curve is a parabola, the tangent A B will cut the line B D so as to make B C = C D. The bending moment throughout the length of the column, due to the end load W will vary as the ordinates of the parabola A C E. A side load on the column would give bending moments varying in the identical manner. The inclination of A B with the axis A E gives a basis for determining an equivalent side load that will give this identical curve of moments, for the shear in the column at end is to the load W (by similar triangles) as B D is to A D. The total side load is then found to be $8\ n\ W$, as indicated in the figure.

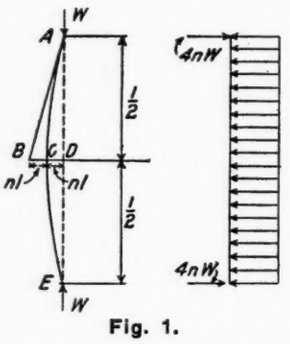


Fig. 1.

Suppose now that the column has an initial bow $n\ l$. The end load W will act to increase this bow by an amount which we will call y. The value of this increment to the deflection may be found by the well-known formula for a uniformly loaded beam or

$$D = 5\ W\ l^3 \div 384\ E\ I.$$

For D we will substitute y and for W we will substitute $8\ n\ W$. Then

$$y = 40\ n\ W\ l^3 \div 384\ E\ I \ldots\ldots\ldots\ldots (1)$$

After the column deflects the amount y it will not stop, because the bow is increased by this amount y, which increases the equivalent side load by the same fraction of y that y is of $n\ l$. There will therefore be an increasing deflection until the fractional increment vanishes. Such a series can only be vanishing when the first increment y is less than the original bow $n\ l$. If y is equal to $x\ n\ l$, x must be a fraction, or the column will continue to deflect until failure results. When x is fractional the sum of the series is as follows:

$$x + x^2 + x^3 + \text{etc.} = x \div (1 - x) \ldots\ldots\ldots (2)$$

It is seen that the sum for $x = 1$ is infinite. Hence when the calculated increment by equation (1) is equal to $n\ l$, the column must fail, as it will continue to deflect sidewise. This is true no matter how small the original bow, so nothing but absolute perfection would save the column, and this is unattainable.

If we make $y = n\ l$ equation (1) reduces to

$$W = 48\ E\ I \div 5\ l^2 \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

This shows the total load on any column that will cause failure by bowing.

It is to be noted that Euler's formula for columns with round ends is identical with equation (3), except that where equation (3) has 48 ÷ 5 or 9.6 Euler's formula has the square of π or 9.87. Euler's formula, however, is confessedly merely useful in arriving at the relative strength of columns of different lengths and sections. The important step in the deduction of equation (3), here given, described just above that equation, is lacking in the deduction of Euler's formula. Because of this omission writers have not recognized in it a formula showing the absolute maximum strength of a column of elastic material having round ends.

The writer is not familiar with Euler's original demonstration of his formula, but he cannot find in English versions of it any proof of the stated premise that the formula shows the conditions when a column is in unstable equilibrium and has a deflection that will not be increased by the applied load. He cannot see why "under this load the column just begins to deflect, and will under a constant load retain any deflection which may be given to it, within the elastic limit of the material." (Johnson's Framed Structures.) The elastic limit does not enter in the formula or its derivation.

If K equals the unit stress in the column or $W \div A$, where A is the area, we find by substituting for W its equal $K\ A$ and for I its equal $A\ r^2$, the following:

$$\frac{l^2}{r^2} = \frac{48\ E}{5\ K} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

This expresses the relation between the unit stress and the length and radius of gyration in a column at rupture under certain conditions, which will be stated presently. The original bow of the column does not enter. Only the existence of an initial bow is assumed, and this may be ever so minute. The unit stress satisfying this formula, in an elastic material, when the column is pin-ended, will cause the column to bow and to continue to bow until failure results. It is to be noted that the only property of the material entering in the formula is the modulus of elasticity. As the modulus of elasticity of all grades of steel is practically the same, it would mean that a steel column of some given section and length will fail by bowing under a certain axial load, no matter what the compressive strength of the steel is. Advocates of the use of nickel and other alloy steels for compression members are commended to a study of this startling assertion.

To make equation (4) more easily understood let us assume in steel columns a unit stress K of 10,000 and E = 30,000,000. Reducing we find the ratio l over r to be 170. At K = 20,000, l over r = 120. At K = 30,000, l over r = 98. At K = 40,000, l over r = 85. At K = 50,000, l over r = 76. At K = 60,000, l over r = 69.

In wooden columns if E = 1,500,000, at K = 500, l over r = 170. At K = 600, l over r = 155. At K = 800, l over r = 134. At K = 1,000, l over r = 120.

In cast iron columns, if E = 20,000,000 (in tests at Watertown Arsenal made in 1904 and 1905 the modulus of elasticity for unit tension in cast iron up to about 5,000 is from 20 to 30 million) at K = 5,000, l over r = 196. At K = 6,000, l over r = 179. At K = 7,000, l over r = 166. At K = 10,000, l over r = 139.

The three foregoing paragraphs contain what the writer believes to be astounding revelations. For example, in the first of these paragraphs we see that the *ultimate* strength of a steel column whose ratio of slenderness is 170 is 10,000 lbs. per sq. in. In handbooks for use of designers the ordinary column formula (Gordon-Rankine) is accommodatingly worked out up to ratios of about 250, and the ultimate strength of a pin-ended column is given as about 19,000 lbs. per sq. in. at l over r = 170. However, the case is not so serious as this might lead one to think. For slender columns the ultimate strength shown by equation (4) is in reality the limit of elasticity and not the crushing limit of the steel; a factor of safety between 2 and 3 would be sufficient in such case. The ultimate strength represented by the Gordon-Rankine formula referred to is based on the crushing strength of the steel; a factor of safety of 4 or 5 would be used here.

As illustrating the diminishing relative strength of high steel columns of slender proportions, compared with ordinary structural steel, some tests made by J. A. L. Waddell, and described in *Engineering News*, Jan. 16, 1908, will be cited. In a series of 12 tests three in nickel steel, at l over r = 27 averaged 75 per cent. greater in ultimate strength than three similar columns in carbon steel. This was about the ratio between the elastic limits of the two grades of steel. Three columns in nickel steel, at l over r = 81, were only 47 per cent. stronger than three similar columns in carbon steel. There is no doubt that, as equation (4) would indicate, columns still more slender will approach closer to the same ultimate strength. It is probable that the difference would vanish at high ratios. High steel is then not economical for light struts, and other light compression members, though it may have advantages for heavy compression members.

It is pertinent to note here that, while Mr. Waddell's tests in nickel steel show only 75 per cent. more strength at a ratio of slenderness of 27, his recommended unit stress is 90 per cent. above the commonly used unit on carbon steel columns; also, while his tests in nickel steel show only 47 per cent. more strength at a ratio of 81, his recommended unit stress is 96 per cent. above the commonly used unit on carbon steel columns.

As illustrating the effect of a small deflection or bow in the original column and showing the manner in which this bow increases when the ultimate load is approached, the tests described by Mr. C. P. Buchanan in *Engineering News*, Dec. 26, 1907, are cited. In these the deflection due to the load did not exceed 0.2 in. within the elastic value of the column for any column tested, and at the ultimate load this deflection was not exceeded in many cases. It is to be noted, however, that a small bow in a column induced by direct stress may be of far greater moment than a much larger bow in the column initially. In other words, when the bow is the result of stress in a practically straight column, it means incipient failure, and is serious; whereas a column built in a bow or bowed by handling may stand the safe load calculated for it without being in danger, if the bow is not excessive. Again a bowed column that has been straightened in the shop is apt to have internal stresses which the applied load will relieve rather than intensify. Such a column, bowed under its safe load, shows a recovery of the normal condition of the metal rather than, of necessity, a dangerous condition.

It is evident that equation (4) has practical application to slender columns only, inasmuch as it shows unit stresses in excess of the crushing strength of the material when the ratio of l to r is small. The formula does not deal with the ultimate strength of a column as regards its ability to resist crushing but merely the ability of an elastic material, having a given modulus of elasticity, to resist bowing due to the direct load. The strength of the column as to its ability to resist crushing must be determined from a different standpoint, and this is the other of the two phases of the strength of a compression member referred to at the beginning of this article.

Use other values as in the foregoing and let K^1 = the extreme fiber stress in the column due to a bow $n\ l$; also let h = the depth out to out of the section (assumed symmetrical) or twice the distance from neutral axis to the extreme fiber. The load on the column is $K\ A$, as before, and the bending moment for the bow $n\ l$ is $K\ A\ n\ l$. By the theory of flexure this moment must be equal to the product of the extreme fiber stress and the section modulus, or

$$K\ A\ n\ l = 2\ K^1\ A\ r^2 \div h.$$

From this we have

$$K' = K\ (n\ l\ h \div 2\ r^2) \ldots\ldots\ldots\ldots\ldots (5)$$

The term in the parentheses in equation (5) is a fraction representing the increment to the direct stress, which increment is due to the original blow of the column.

This increment will in turn give rise to an added increase in the extreme fiber stress by reason of the deflection or bow which it causes in the column. The amount of this bow is y in equation (1), making $W = K\ A$, and the extreme fiber stress K'' added on account of the same bow is found by using this value of y in equation (5) in place of $n\ l$, or

$$K'' = \frac{K\ n\ l\ h}{2\ r^2} \times \frac{K\ l^2}{9.6\ E\ r^2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The last term in equation (6) is the relation between the successive increments to the extreme fiber stress or x in our series. The total extreme fiber stress is then $K + K' + K''$, the latter being expanded by the series above refered to, or, letting this total fiber stress be represented by k, we have

$$k = K\left(1 + \frac{n\ l\ h}{2\ r^2} + \frac{n\ l\ h}{2\ r^2} \times \frac{K\ l^2}{9.6\ E\ r^2 - K\ l^2}\right) \ldots\ldots\ldots (7)$$

Solving for K we have

$$K = M - \sqrt{M^2 - N} \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

where $M = (k\ l^2 + 9.6\ E\ r^2 + 4.8\ E\ n\ l\ h) \div 2\ l^2$

and $N = 9.6\ k\ E\ r^2 \div l^2$.

This equation would be very cumbersome to use in practice, but, as will be shown, the locus of equation (8) is almost a straight line for the practical ratios of l to r.

The one assumption or postulate referred to at the head of this article is this: that the original bow in a column is a constant fraction of the length, the shape of the column axis being a parabola and the amount of the bow being $^1/_{800}$ of the length. The deduction of equation (8) is purely theoretical and in agreement with the common theory of flexure, with the unimportant error that the deflection due to endwise compression will not keep the axis of the column exactly in a parabolic curve.

As the writer stated in discussion of lattice bars in the Engineers' Society of Western Pennsylvania (Vol. 23, No. 9): It is reasonable to assume that a compression member that varies from a truly straight line more than one-quarter of 1 per cent. of its length would be laid aside by an inspector as imperfect and needing straightening. It is probably close to the truth that deviations from a straight line not much less than this will pass undetected or will be accepted as commercially perfect. In a 10-ft. member this would be $\frac{5}{16}$ in., in a 40-ft. member $1\frac{1}{4}$ in., in a 60-ft. member $1\frac{13}{16}$ in. The observed deflection of the much-talked-of chord member A9 of the Quebec bridge was but little over one-quarter of 1 per cent. of the length.

To make some allowance for imperfect centering of the application of the load, which would also vary about with the size or length of member, the value $^1/_{800}$ will be used for n in equation (8).

In an ordinary built section the radius of gyration is about four-tenths of the depth. In a solid rectangular section it is 0.29 of the depth. An average between these would give nearly $h = 3\ r$.

Using these values in equation (8) and plotting the locus for $k = 16{,}000$ we have the curve shown in Fig. 2. Comparing this with the commonly used formula

$$P = 16{,}000 - 70\ \frac{l}{r}$$

we see that there is close agreement up to a ratio of slenderness of 150.

This straight line formula, as given first by T. H. Johnson (Trans. Am. Soc. C. E., Vol. 15, 1886), is deduced from the result of tests, and has always been heralded as exemplifying the failure of theory to agree with practice or tests, since it is out of agreement with the Gordon-Rankine formula, held out to be the correct theoretical formula.

By assuming n greater or less than $^1/_{800}$ the locus of equation (8) will fall inside or outside of the position in Fig. 2. By using a value of zero for n the formula will show a constant unit stress. It is thus seen that a perfectly straight column, with a load perfectly central, will stand a unit stress equal to the elastic limit of the material, unless the load equal that shown by equation (3). This accounts for the fact brought out by T. H. Johnson in his paper heretofore alluded to, that some isolated tests show exceptionally high results. A perfect column formula is neither a possibility nor a desideratum. If a perfect column formula were possible, only a perfect column would satisfy it.

It is further evident that no theoretical formula should be used for slender commercial columns, since no theoretical formula can show zero strength, no matter how slender the column. A practical column formula must show small strength for slender columns or compression members because of the danger of overstress due to side force or weight of the member itself. This is a very strong argument for a straight line formula.

That the bulk of the tests made agree with the straight-line

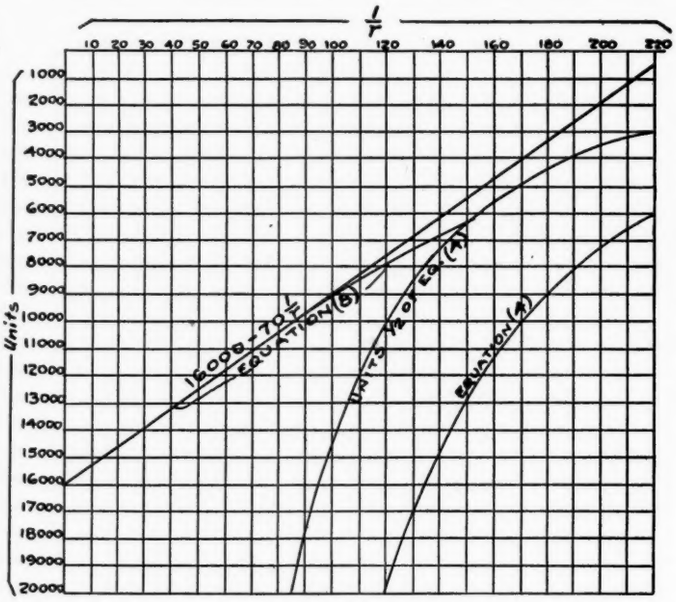


Fig. 2.

formula which has been so extensively used for many years is evidence that the simple assumption here made, namely, that a column which does not deviate from a straight line more than one-quarter of 1 per cent. of its length is commercially straight. Further, the complete agreement here shown between theory and practice, so far as agreement is a possibility where imperfections enter as a factor, removes it from the category of presumption to ask, *Why not drop all curved-line formulas, as being neither correct theoretically nor experimentally?* This, of course, excepts the formula of equation (3), which, as shown, is true independent of the strength of the material.

In Fig. 2 is shown the locus of equation (4), also a locus whose units are one-half of those in equation (4), as representing safe loads on a column as a bow. It is seen that this cuts the locus of equation (8) at about a ratio of slenderness = 150. It would therefore terminate the usefulness of equation (8) at that ratio.

The deduction of equation (8) makes it applicable to compression members with pin or hinged ends. The straight line formula as usually given is applied indiscriminately to square as well as pin-ended members. This is somewhat offset by the fact that riveted members are not usually as carefully centered as pin-connected members.

In conclusion the writer begs to say that while he believes

the foregoing is sufficient justification for discarding some illogical theoretical deductions regarding the strength of columns, he is glad to point out that the current methods of column design are in no wise disturbed, except such methods as are still in vogue based on the illogical deductions alluded to.

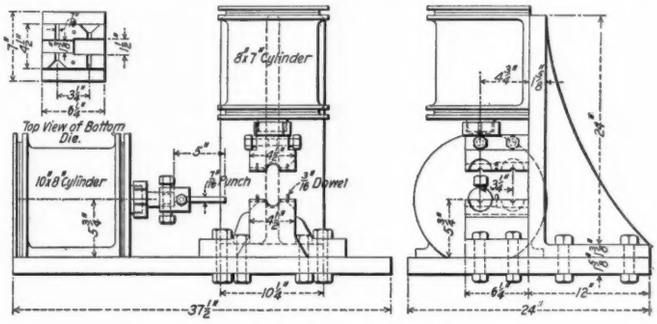
This article is written to show that there is sound basis in theory for what years ago experiment proved to be true in spite of the apparent contradiction of theory.

USEFUL DEVICES AT SILVIS SHOPS OF THE ROCK ISLAND.

The tool rack used in the tool room of the Silvis shops of the Rock Island, shown herewith, was designed to economize floor space. It is only 31½ in. wide at the bottom, decreasing to 24 in. at the top. As will be noted from the end view, the longer tools are put in one side and the shorter ones in the other, one set of shelving being half the length of the other. A useful feature of the rack is the incandescent lights, there being two 4-c.p. lamps above each shelf, or 24 to the rack.

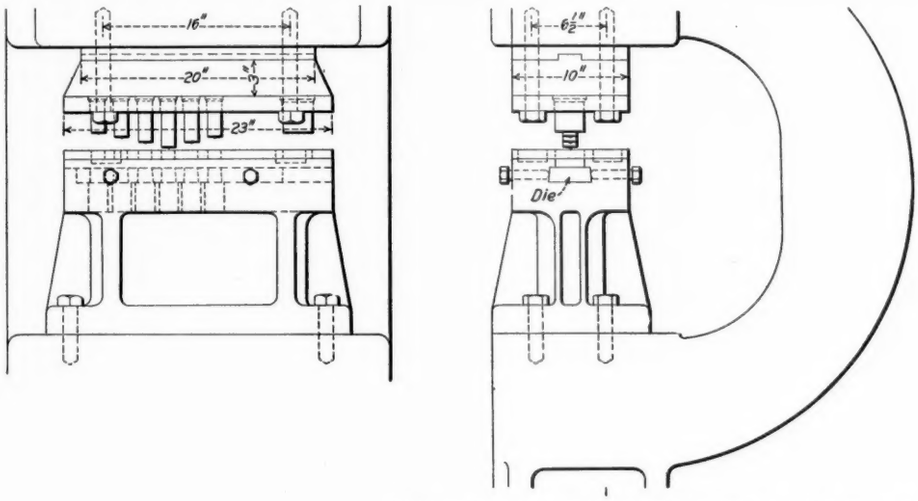
Some 40 of the material buggies here shown are in use at these shops. These buggies were first built for the blacksmith shop, but they were so convenient that their use has been extended to all other departments where material is handled in quantities. The body is made from old side sheets and is mounted on standard baggage truck wheels, which are roller-bearing. The caster is bought.

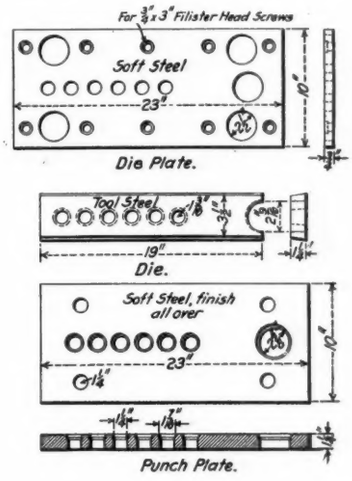
The pneumatic punch for cotter pin holes, etc., will punch a $\frac{7}{16}$-in. hole through a 1½-in. steel knuckle pin. This machine will punch ten heated knuckle pins while one is being drilled. Formerly, rectangular holes were punched in a forging machine and round holes were drilled. This punch, which saves 75 per cent. in time, was built out of scrap. It is used for knuckle pins, cellar bolts, key-bolts for brake connections, and for brake and grate rigging, and in fact for any bolt using a cotter or a flat key.



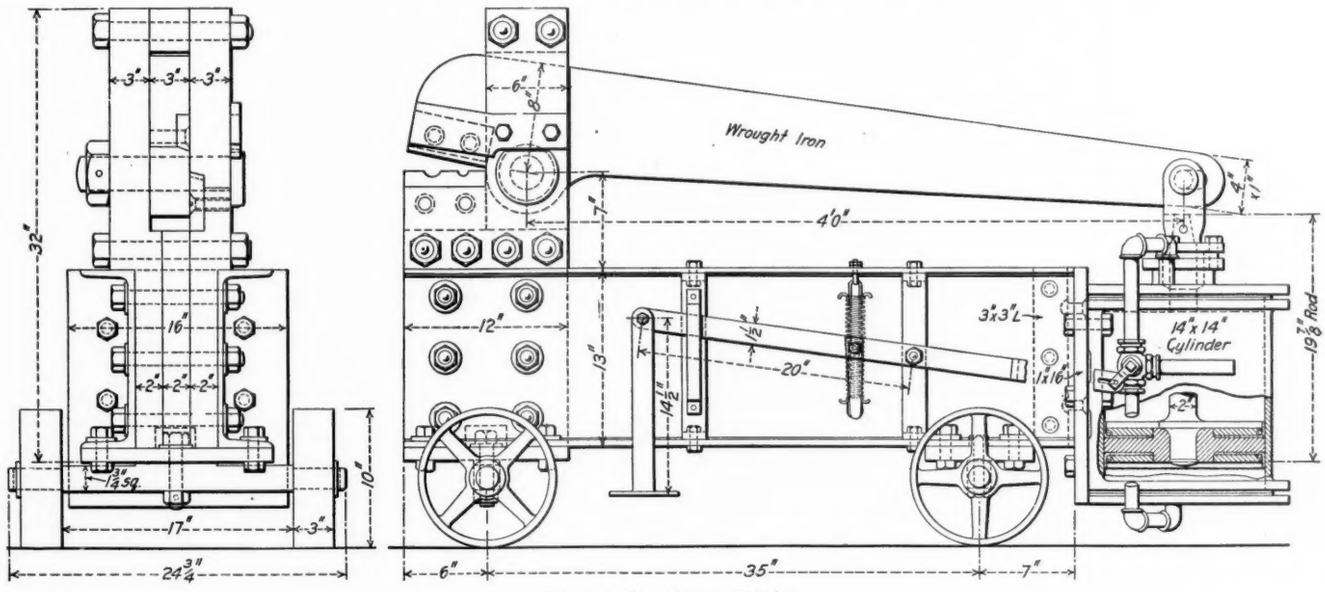
Pin and Flat Key Holes.

Another device built from scrap is the portable shears for





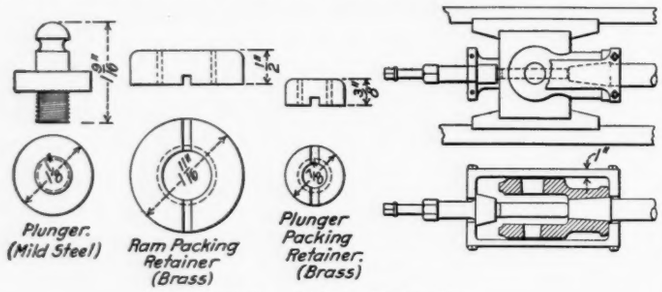
Gage Punch for Brake Rod Jaws and Lever Guides.



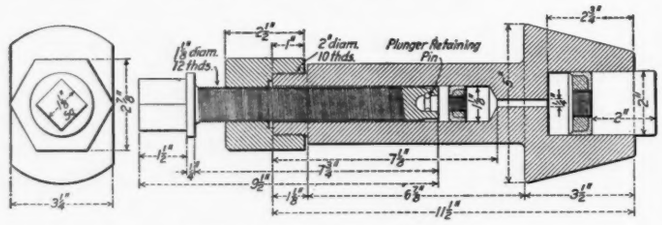
Shears for Scrap Dock.

the scrap dock. This machine, which can be moved around by one man, has a maximum capacity of 1¼-in. round material. The details of construction are clear from the drawing, the power being controlled by the foot of the operator.

The gang punch for brake rod jaws and dead lever guides is used in a hydraulic press. The six punches shown in the drawing are for the dead lever guides, the extra ones being



Hydraulic Piston Extractor.



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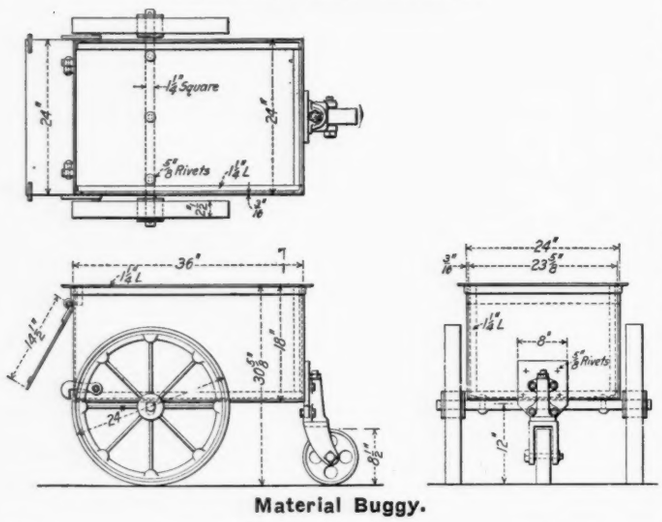
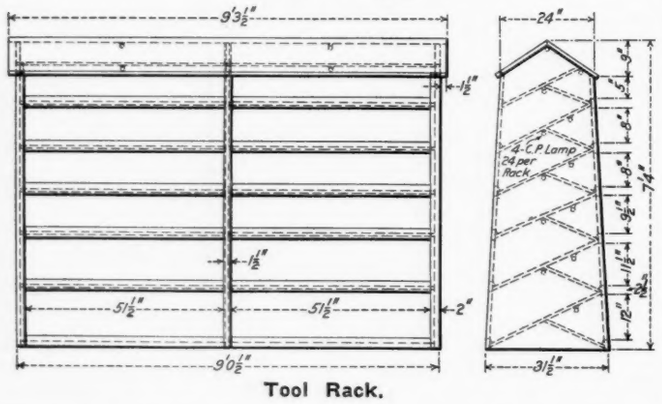


Material Buggy.



Tool Rack.

removed when punching brake rod jaws. The device cuts off the piece at the same time that it punches it, giving it the necessary rounded end in the operation. The large punch at the right-hand end is for this purpose, the die having a semi-circular opening to correspond.

The details of a hydraulic device for forcing piston rods out of crossheads are shown, with a sketch illustrating the method of application. This latter includes a rectangular yoke against which the extractor pulls as pressure is put on the rod through the short strut interposed between it and the ram of the extractor. The plunger, which is screw-actuated, is 1⅛ in. and the ram 2 in. in diameter.

ENGINEERING RESPONSIBILITY.*

In our studies of failed and broken parts in connection with our work at Altoona for now some years, we have been gradually led to ascribe failures to one or more of the four following causes, viz., to bad material, bad workmanship, bad or faulty design or to unfair treatment.

Let us spend a few moments with each of these possible causes of failure. First, bad material. This does not cover those cases where the wrong kind of material was used or material not adapted to the work. If cast-iron is used when steel should have been employed, if the steel is brittle when the service requires tough, tenacious metal, this is no fault of the material. Failures due to the employment of material unfitted to the service come under another category. Nor can the material be blamed if the size of the part which fails is too small. This cause of failure also comes under another category. But material is bad, and may justly be charged with being the cause of failure when it is different from what those who put it in service had a reasonable right to expect it to be. A rail with a bad pipe in the head, an axle made from a badly segregated bloom, a piece of concrete in which the materials are improperly mixed or contain not enough or inferior cement, are all examples of bad material, and if failure comes the failure may justly be charged to the material.

But why is there ever any difficulty between the producer and consumer about material? The price is agreed upon when the order is taken and the quality of the material is either specified or understood. Why, then, does not the producer always furnish good material?

Our experience on this point has brought us face to face with several explanations of the difficulty we are considering. First and perhaps most important is the price. It is constantly urged that the consumer will not pay the price requisite to secure the materials desired. No information is usually given as to how far the wished-for price, requisite to secure such good materials as the producer would like to furnish, covers a desire for large profits, and consequently consumers have always been a little slow in attaching much weight to this excuse. Prices are largely determined by competition, and in the absence of something more than a verbal statement from the producer that better materials would be furnished at a higher price, he would be a bold purchasing agent that would pay the higher rate. On the other hand it is undoubted that competition is the antagonist of quality, and where materials are bought without reasonable specifications rigidly enforced there is unquestionably much weight in the contention of the producer.

Another reason or excuse for poor materials is that processes and methods of manufacture do not always and every time yield the desired first quality product. Strive as the manufacturer may, the works always turn out some material that is inferior.

Another and most pernicious excuse for furnishing bad materials is the attempt so common everywhere on the part of producers to usurp the legitimate functions of both the consumer and his expert. This manifests itself in the statement, so commonly made by those furnishing material, that it is good enough for the purpose, thus arrogating to themselves the right to decide not only how the material shall be made, but also what kind of material the consumer and his engineer shall use. Pernicious though this custom may be, a good deal may be said in palliation of it. The practice is the outgrowth of an historical situation. In the earlier days,

*From the presidential address delivered before the American Society for Testing Materials, on June 29, by Dr. Charles B. Dudley.

when the consumption of materials was only a fraction of what it is at present, the producer of any material was supposed to know not only how to manufacture it, but also its characteristics and how it would behave in service, and consequently consumers who in those days had scarcely begun to study for themselves the behavior of materials in service, naturally turned to the manufacturers for counsel as to what materials to use. This practice is still in vogue, and it is to be confessed that, where it is employed, no legitimate criticism of the producer can be made if he urges that the material is good enough for the purpose. On the other hand, as time progressed, and large consumers began to study for themselves the behavior of materials in service, it is evident that the situation has changed and that where materials are bought on definite specifications, the voice of the producer as to quality is no longer potent.

Coming now to the second cause for failure in structures, bad workmanship. That bad workmanship is a far too frequent cause of failures is common experience. The tendency to slight the job is almost universal. A rivet or a bolt is left out, with consequent increased strain on those which are actually put in, a forging does not fill out the pattern, or the metal is burned, or a weld is defective. We knew a case once where the construction on á passenger coach involved the safety of human life, and where the drawings required that there should be two nuts on a bolt and the end of the bolt riveted over. After the cars had been in service a few weeks and some minor repairs were being made, it was discovered that the bolts originally used in a number of the cars were too short, that the second nut only grasped one or two threads, and that the remaining space in the nut had been filled with putty, so manipulated and stained as to give the appearance of the riveted end which the drawings called for. We knew of another case where two ends of a gas pipe in a small house were joined with putty, instead of with the well-known sleeve or thimble.

No doubt many will claim that inferior or insufficient compensation is the most fruitful cause of poor quality of work at the hands of those who, in our industrial system, play the part of hewers of wood and drawers of water. But if we are right, the experience of the last few years has not seemed to confirm this view. If this was the real explanation it would seem to necessarily follow that voluntary increase in wages would bring an increase in efficiency. On the other hand, if we may trust the indications that we have been able to gather, the increase in efficiency following voluntary increases in wages has been most disappointing. We must apparently look further for the real reason for poor workmanship.

In our judgment, the method of compensation for work performed has a direct and most important influence on the quality of the service rendered. We refer especially to the piecework system in those places where it is applicable, and to the payment of all interested in proportion to the amount of successful output, which is so common in the steel industry. Both these methods of compensation stimulate output at the expense of quality, and it is not at all strange, perhaps, that after constructions have found their way into service, we should not infrequently find evidences of the haste, the slurring over, and the inferior workmanship which these methods have necessarily done so much to stimulate. We are not at all prepared to suggest any substitute for them, and we are, and have been for many years, an advocate of them from the standpoint of successful management; but it is folly for us to close our eyes to the fact that the piecework and other successful output methods of compensation of workingmen are antagonistic to quality of work, and that, despite all our efforts to the contrary, they may justly be held responsible for some of our engineering failures.

One more phase of the workman problem. Close observers of the modern workman have noticed for some years a growing tendency on his part to manifest less and less interest in his work. Esprit de corps, pride in his work, and a genuine feeling of loyalty and devotion to the establishment of which he forms a part are gradually becoming less and less. The allegiance of the workman, under the influence of the ferment and agitation which now pervades our whole industrial system, is gradually passing over, in a measure at least, to the labor organization. Instead of co-operation there is ofttimes antagonism. Instead of zeal and earnestness on the part of the workman to do his best there is study how to make the organization stronger and secure greater benefits for himself.

We are firmly convinced that if labor organizations would devote less time and energy to contention with employers and more effort toward making the organization stand for skill and plain, simple honesty in workmanship, and for fair dealing with, and reasonable devotion to, the interests of employers, all questions connected with the recognition of the union would fade into insignificance and collective bargaining would be welcomed, nay, even sought for, by those who are managing the great industries of our modern civilization.

Third, it is evident that the engineer who makes or finally decides upon the design of any structure carries a heavy load of responsibility. He is first in the field and practically tells all who follow what is to be done. He must decide not only the kind of material that is to be used, but also the amount or sizes, and how it shall be disposed. His realm embraces every kind of structure, from the foundations of a bridge or building to the most minute detail of a locomotive or car.

The engineer who makes the design labors under two very serious difficulties. First, it is not possible, many times, to compute the strains to which the whole or parts of the structure will be subjected. Perhaps we can make this point clear best in considering the locomotive driving axle. The strains produced, when we regard the locomotive as a vehicle, are simple and easily determined. So likewise the bending moment produced by the action of the steam on the piston, as well as the torsion strain produced by the crank. But who can tell the bending moment produced by the lurch when the wheel strikes a curve at high speed? Who can even give a guess at the strain produced when the brake is applied, making an emergency stop at sixty miles an hour? Moreover, the tendency of the times is toward larger and larger structures. And as the parts increase in size, would any of us be willing to say that the strains in each part would increase directly proportional to the increase in size of the whole structure, or, that a proportional increase in size of any given part would so successfully meet the increased strains as did the corresponding smaller parts of the original structure? The engineer who makes the design, perhaps more often than any of us, is at the end of his knowledge, and if failure comes due to defective or faulty design deserves, in our opinion, more sympathy than any one else involved.

But the designer labors under another serious difficulty. He is often overruled and prevented from doing what his judgment prompts him to do, in the interests of safety, by those who control expenses. The construction he would like to use costs more, and the management for economic reasons demands something less expensive. Of course, under these conditions, much responsibility is taken off the designer. And while we are ready to allow that some check is desirable, since those who make the design are, after all, human and naturally will take care of themselves, we cannot but feel that this check should be sparingly applied in all places where safety to human life is involved.

Fourth, unfair treatment. As already indicated, there is a natural disposition on the part of each of us to relieve ourselves from blame and put the fault on someone else, and if our observation is worth anything there is no field of parceling out deserts among those involved in failures and the responsibility therefor more fertile than this one of unfair treatment. This field is the especial paddock of the maker or

producer of material. If a rail breaks or fails in service there was, says the rail maker, something wrong with the track or with the locomotives or cars that run over it. If a car wheel breaks or fails to give the guaranteed mileage, the track was too rough, the use of the brakes too severe, or the lading too heavy, and so on. Far be it from us to say that unfair usage is not many times a legitimate explanation of failures. If a freight locomotive, designed to haul a heavy load at twenty miles an hour is used at times on a passenger train at forty miles an hour, and in so doing shakes herself to pieces, the fault is certainly not in the materials nor in the workmanship, nor in the design, but in the unfair use.

There is, however, another phase of this part of our subject. Unfair treatment is very much broader than the obvious misuse of a bridge or of a moving vehicle. The materials entering into a structure may be unfairly treated. If the calculated strains are too high, or what amounts to the same thing, too low a factor of safety is employed, materials are unfairly used. Still further, where a structure is a composite it may, and undoubtedly does, often happen that the elements making up the composite are unfairly treated, as when, for economic reasons, not enough money is spent to properly install the structure. For example, a steel rail called upon to do its work supported by too few ties, insufficient ballast and a badly drained sub-grade, is unfairly treated. Moreover, the state of repair in which structures are maintained is clearly an element in their fair treatment. If not enough money is spent in repairs and parts become weakened by decay, corrosion or wear to such an extent that failure results, it is entirely obvious that the failure must be attributed to unfair treatment.

No one, I am sure, can contemplate the situation which we have been trying to discuss without being impressed with the diverse and ofttimes antagonistic interests involved. The producer of material is anxious to secure the largest amount of successful output and the greatest possible amount of reward therefor. The consumer wants to limit this by restrictions as to quality and to obtain the material at the lowest possible figure. The workman's interest is to secure the maximum of pay for the minimum of effort, and in this struggle it may perchance happen that the quality of work suffers. The employer's interests are clearly the reverse of the workman's, and so on. The foundation of these diverse interests are of course very deep, and with the present organization of society it is not easy to see how they are to be obliterated or their antagonism neutralized. But we beg to make one suggestion. Would not an infusion of genuine conscientiousness into our industrial life bring an amelioration? If a little less energy was expended in the mad race for wealth and a little more zeal manifested in maintaining the rugged virtues of honesty, integrity and fair dealing, would not some of the friction and contention of our present commercial life disappear? We must all live together, and surely harmony is better than contention. There are some things in life of more value than money.

FREIGHT SYSTEM OF THE DAYTON AND TROY ELECTRIC RAILWAY.

On the majority of steam roads the freight business amounts to several times the passenger business, while the average for forty-nine interurban electric roads in Ohio showed 88.26 per cent. of the total receipts as coming from passenger business, and only 5.81 per cent. of the total from freight, "other business," including lighting and express, making up the balance.

For the year ended June 30, 1908, the freight business of the Dayton & Troy Electric amounted to about 10 per cent. of its total business, but at the present time the freight business represents nearly 20 per cent. of the total business.

The Dayton & Troy is 31 miles long, running from Dayton, Ohio, north to Piqua, and it forms part of the through line to Lima and Toledo and points north, and it has connections for points east in Ohio and west in Indiana. It has alliances with the Western Ohio for through service to Toledo and with the Springfield, Troy & Piqua Railway for through service to Springfield, and it has interline arrangements for through shipments over 20 roads in Ohio and Indiana. In addition to the freight business it operates a car between Dayton and Toledo each night for the Pacific Express Company and from which it receives a proportion of the gross receipts. This, however, is not included in freight earnings.

The freight rolling stock consists of two 55-ft. express motors, two box trailers rebuilt from Manhattan Elevated cars, a number of dump cars and the Pacific Express motor car built in the company's own shops. It also exchanges trailers with the Western Ohio and Springfield, Troy & Piqua and it handles steam freight cars on certain parts of the road. This is done on a switching charge basis paid by the consignee, as the company has no pro-rating arrangements with steam roads.

The official rate classification is used. There are, however, a number of exceptions and such commodities as ice, iced beer, coal, ore, etc., are not handled. Fifth and sixth class goods are handled only at fourth class rates, except between certain points. It is found that it is a good investment to operate the power station all night. The additional cost of running the power station from 1.30 to 4.45 a.m. is figured at about $6 and the cost of the crew at $4.80, or a total of $10.80, while the nightly receipts from a stone train run 26 miles at 35 cents per ton are about $70 per night.

The Pacific Express train leaves Dayton at 6.50 p.m. and runs through to Toledo, 162 miles, reaching there at 1.15 a.m. Returning it leaves Toledo at 2 a.m., reaching Dayton at 8.20 a.m. It makes all station stops and hauls one and sometimes two trailers loaded with freight. The total freight business is said to be earning 40 cents per car mile, including trailer and dead head mileage, while one run on the company's own line is said to average $1 per car mile. The revenue from the express car is about 28 cents per car mile, not including its services as a locomotive, so that it is a good investment.

Harrie P. Clegg, President of the Dayton & Troy, claims that it costs considerably less to operate a freight business than it does the passenger business, making all due allowance for proper charges to the freight department. This is on account of the less frequent service and the smaller car mileage necessary to earn the money. On the division of operating expenses between the freight and passenger departments power is charged on the basis of actual car mileage, considering trail cars on the same basis as motor cars, and the same practice is followed in maintenance of overhead, way and structures; in reality, this gives the freight department the worst of it where frequent trailers are operated, since they do not actually consume the power nor give the same wear and tear as motor cars. Maintenance of equipment is charged directly against the individual car and thus divided between freight and passenger, while miscellaneous shop expenses and salaries are divided on a mileage basis. The same is true of general office expenses, except that men who work exclusively for the freight department are charged to freight. Where there are joint agents the division is on a basis of revenue for that station. Transportation charges are of course charged direct to each department. Printing and advertising accounts are charged direct except where they are for the property in general, and then they are divided on a basis of revenue.

The company has provided its freight department with blanks of every description that are likely to be needed in the transaction and promotion of business, and keeps complete records of all transactions. The interline freight tariff compiled by the Dayton & Troy provides for shipments of merchandise over 18 roads in Ohio and Indiana. The book follows the requirements of the Interstate Commerce Commission and the Ohio Railway Commission.—*Electric Traction Weekly.*

LONDON SUBURBAN TRAFFIC.

The diagram which is reproduced herewith from the report of the London Traffic Branch of the Board of Trade, gives a graphic representation of the density of railway traffic on the London suburban railways, and affords an indication of its volume and distribution. It serves to show, among other things, how unequally the traffic is distributed. The original diagram was carefully compiled from information supplied by the railway companies as to the number of passengers from all stations within 30 miles of London who entered the central area by railway in the month of October, 1907. The number of zones represented on the diagram is five, and they represent areas varying from 4 to 15 miles distance from Charing Cross.

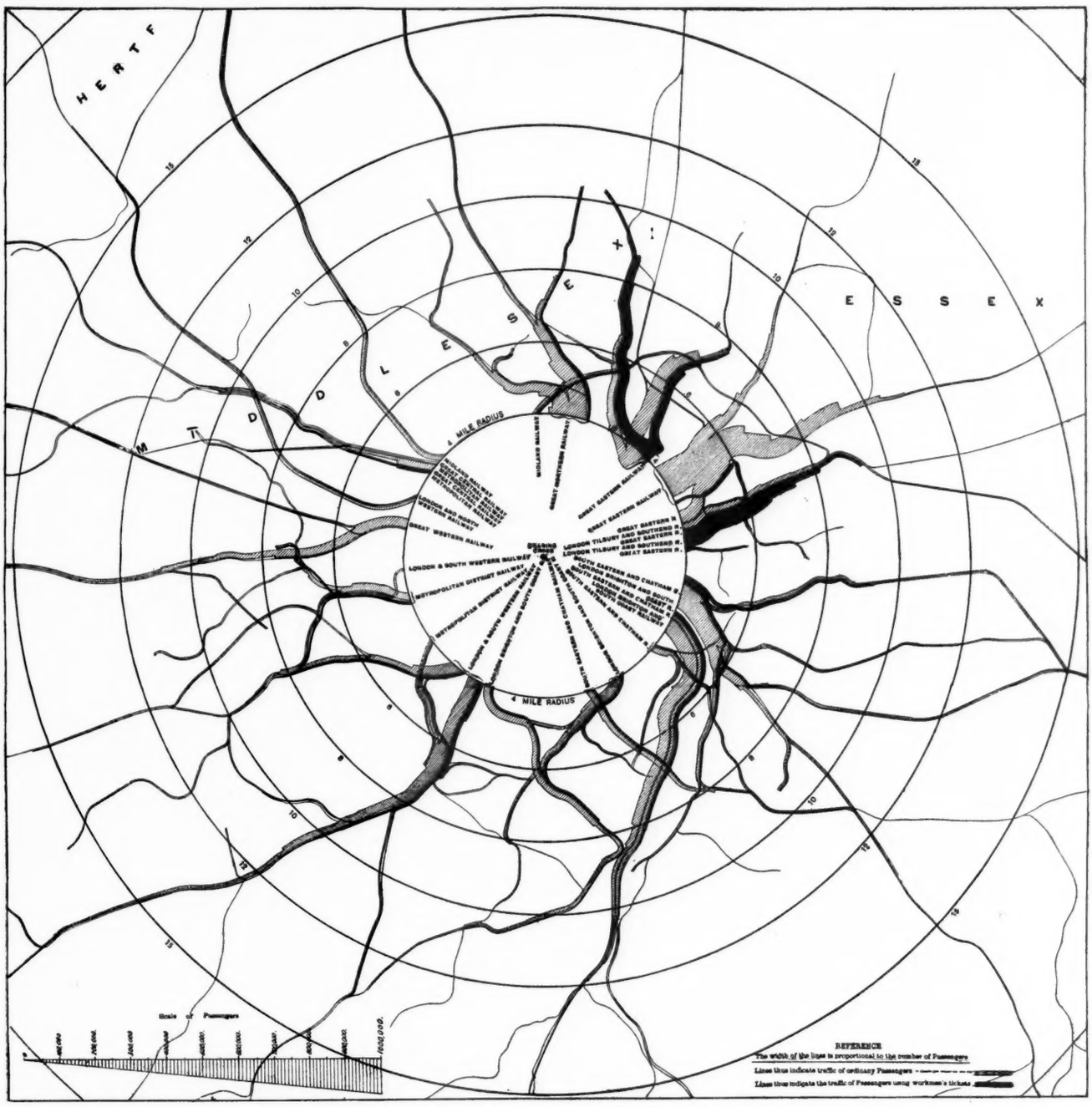

HERTF
M I D D L E S E X
E S S E X
4 MILE RADIUS
4 MILE RADIUS
GREAT WESTERN RAILWAY
LONDON & SOUTH WESTERN RAILWAY
METROPOLITAN DISTRICT RAILWAY
GREAT EASTERN RAILWAY
LONDON TILBURY AND SOUTHEND R.
GREAT EASTERN R.
SOUTH EASTERN AND CHATHAM R.
REFERENCE
The width of the lines is proportional to the number of Passengers
Lines thus indicate traffic of ordinary Passengers
Lines thus indicate the traffic of Passengers using workmen's tickets

Diagram Showing Railway Traffic Density of London Suburban Area.

In appendix A to the report there are two tables, one of which (Table II) shows the number of ordinary passengers, irrespective of class, who traveled to London in the course of the month from stations in certain zones. The figures include the estimated number of journeys in one direction taken by the season ticket-holders, but do not include the journeys of passengers who took return tickets in London, nor do they include any journeys between suburban stations.

In the same appendix Table III gives similar information with regard to passengers traveling at workmen's rates.

Taken together the figures in the two tables show that of 9,743,669 passengers who entered London by railway from the suburban districts in the month of October, 1907, 8,071,785—nearly 83 per cent.—came from distances not exceeding 10 miles from Charing Cross, more than 8.5 per cent. came from distances between 10 and 12 miles and less than 8.5 per cent. from distances between 12 and 30 miles.

The density of railway traffic in the different zones may be gaged by comparing the number of passengers per square mile. The following table shows in a summary form the total number of passengers who entered London from each zone,

the area of each zone, and the number of passengers per square mile:

Table I.

	Dist. from Charing Cross, miles.	Area in sq. miles.	Passengers—No.	Passengers—No. per sq. miles.
Zone 1	4 to 6	63	2,232,201	35,584
" 2	6 " 8	88	3,406,588	38,729
" 3	8 " 10	113	2,432,996	21,512
" 4	10 " 12	138	843,780	6,104
" 5	12 " 15	244	238,252	977
" 6	15 " 20	560	331,213	592
" 7	20 " 25	707	151,025	213
" 8	25 " 30	864	107,614	124

The number of people who live in the country and travel daily to their business in London is constantly increasing. Such people measure distance by time rather than miles, and the further the railways will carry them within an hour, the further they will go. At the end of 1907, 4,000 season tickets were in use between Southend and Fenchurch street, a distance of 36 miles—covered by the fastest trains in 50 minutes. There are many who come up to London daily from places as far distant as Brighton, 50.5 miles. Railways have a double interest in promoting the development of residential districts outside the immediate neighborhood of London, since at distances of 20 miles or more they carry, not only the people themselves, but the goods which they consume; whereas nearer the center the goods are carried by road. The London & South-Western has lately taken a new departure by issuing third-class monthly season tickets between Waterloo station and nearly every important suburban station, including places as far distant as Weybridge, 19 miles; Chertsey, 22.5, and Woking, 24.5, at prices approximating to the total cost of daily workmen's tickets during the same period, with the additional advantage of being available on any ordinary train.

Table II.—*Number of Ordinary Passengers Who Traveled to London by Railway in the Month of October, 1907, from Suburban Stations Within Certain Distances of Charing Cross.*

Railway.	Miles 4 to 6.	6 to 8.	8 to 10.	10 to 12.	12 to 15.	15 to 20.	20 to 25.	25 to 30.	Totals.
Great Eastern	229,464	1,091,986	495,036	161,911	55,233	13,899	7,760	.....	2,055,298
London & South-Western	141,301	120,710	750,203	143,674	29,911	85,842	12,273	13,468	1,297,382
Midland	59,976	54,470	5,503	.....	12,877	33,113	14,759	20,624	201,322
London & North-Western	.....	.....	14,168	21,270	13,149	22,537	3,783	3,655	78,562
Great Central	.....	.....	5,247	12,370	12,400	7,081	4,854	5,029	46,981
Great Western	.....	79,167	83,114	26,389	11,841	31,584	21,571	30,835	284,501
London, Tilbury & Southend*	2,544	45,449	55,057	.....	2,508	19,322	16,165	6,868	147,913
Great Northern	631,684	202,572	101,306	65,923	5,679	8,755	4,942	11,838	1,032,699
London, Brighton & South Coast	357,291	258,373	81,790	150,103	14,312	14,183	11,736	4,085	891,873
Metropolitan	94,184	25,372	.....	42,291	8,185	5,085	1,142	2,546	178,805
Metropolitan District	97,872	143,298	24,547	12,592	.....	.....	.....	.....	278,309
South-Eastern & Chatham	228,656	330,730	304,167	84,801	47,867	55,644	51,358	7,847	1,111,070
Totals	1,842,972	2,352,127	1,920,138	721,324	213,962	297,045	150,352	106,795	7,604,715

*There is a daily traffic from Leigh (34 miles), Westcliff (36 miles), and Southend (37 miles), which is reckoned at 125,602.

Table III.—*Number of Passengers Using Workmen's Tickets Who Traveled to London by Railway in the Month of October, 1907, from Suburban Stations Within Certain Distances from Charing Cross.*

Railway.	Miles 4 to 6.	6 to 8.	8 to 10.	10 to 12.	12 to 15.	15 to 20.	20 to 25.	25 to 30.	Totals.
Great Eastern	48,215	410,600	146,384	25,165	.....	.....	.....	.....	630,364
London & South-Western	53,963	46,363	54,858	35,934	11,239	15,245	.....	.....	217,602
Midland	13,533	23,484	18	.....	355	271	.....	47	37,708
London & North-Western	.....	.....	3,057	8,196	4,089	11,740	160	72	27,314
Great Central	.....	.....	3,707	2,833	.....	.....	.....	.....	6,540
Great Western	.....	2,120	2,218	706	300	821	513	700	7,378
London, Tilbury & Southend	21,293	260,665	157,279	.....	.....	.....	.....	.....	439,237
Great Northern	64,989	35,378	12,464	15,494	.....	1,645	.....	.....	129,970
London, Brighton & South Coast	65,468	99,051	38,121	8,294	299	.....	.....	.....	211,233
Metropolitan	35,683	21,952	.....	11,461	83	1,023	.....	.....	70,102
Metropolitan District	33,972	36,898	2,650	6,117	.....	.....	.....	.....	79,637
South-Eastern & Chatham	52.113	118,050	92,102	8,256	7,925	3,423	.....	.....	281,869
Totals	389,229	1,054,461	512,858	122,456	24,290	34,168	673	819	2,138,954

TESTS ON GERMAN RAILS MADE IN THE ELECTRIC FURNACE.

Up to the present it is said that about 5,000 tons of rails have been made from steel from the electric furnace at the Roechling Iron & Steel Company, Voelklingen, Germany. The furnace is of a special combination electrode and induction type, known as the Roechling Rodenhauser, and takes three-phase current at 25 periods.

The pig iron is blown in a basic lined Bessemer converter, then transferred to the electric furnace for refining at an expenditure of power of 125 kilowatt hours per ton. Recently some tests have been published, made Nov. 27, 1908. The analysis of the three pieces then tested was as follows:

Carbon	0.75 per cent.
Silicon	0.10 "
Manganese	0.67 "
Sulphur	0.044 "
Phosphorus	0.023 "

The rails were of flange section, 82.65 lbs. to the yard.

Drop tests were made on 6-ft. lengths, bearings 3 ft. 6 in. apart, the ball weighing 1,760 lbs. The first two pieces were tested alternately on the head, then turned over and on the base, giving the results shown in Table I.

Table I.—Drop Tests.

Test.	Blows.	Height of Drop.	Deflection.
One	1 head	24.9 ft.	2.36 in.
	2 base	16.4 "	Straight
	3 head	26.6 "	2.91 in.
	4 base	18.0 "	Straight
	5 head	27.9 "	3.54
	6 base	27.9 "	Just broken
Two	1 head	27.9 "	2.60 in.
	2 base	16.4 "	Straight
	3 head	27.9 "	3.15 in.
	4 base	20.0 "	Just broken

The remaining piece was tested on the head only, according to the Prussian State Railway specifications with the results shown in Table II.

Table II.—Drop Tests.

Test.	Blows.	Height of Drop.	Deflection.
Three	1 head	6.15 ft.	0.63 in.
	2 "	6.15 "	1.18 "
	3 "	6.15 "	1.61 "
	4 "	6.15 "	1.93 "
	5 "	6.15 "	2.28 "
	6 "	6.15 "	2.64 "
	7 "	6.15 "	2.99 "
	8 "	6.15 "	3.31 "
	9 "	6.15 "	3.62 "
	10 "	6.15 "	3.94 "
	11 "	6.15 "	4.29 "
	12 "	6.15 "	4.61 "
	13 "	6.15 "	4.92 "
	14 "	6.15 "	5.24 "
	15 "	16.40 "	Broken

Physical tests were made on these three rails; the pieces have a length between punch marks of 7.94 in. and a diameter of almost 1.0 in., being 0.975, 0.966, 0.984 respectively. These results are given in Table III.

Table III.—Physical Tests.

Number.	Ultimate stress.	Elongation.	Reduction of area.
1	123,341	12.25 per cent.	21.00 per cent.
2	126,172	12.25 "	12.60 "
3	122,765	13.80 "	20.40 "

They show excellent ductility, in conjunction with tenacity.

The rails were also tested for hardness with the Brinell ball machine, the ball being 19 millimeters in diameter, and the weight 112,200 lbs. The depth of impression was 3.4, 3.4 and 3.5 millimeters respectively and the hardness number 250.32, 250.32 and 243.18.

General News Section.

At Wilkes-Barre, Pa., June 25, warrants were issued for the arrest of six dining car conductors of the Lehigh Valley, charging violation of liquor laws.

The question of the constitutionality of the law establishing the state railroad commission of Colorado is still unsettled. The members of the commission are performing the functions of their offices, but to get their salaries they have to give bonds to the state treasurer.

C. D. Kellogg, Secretary of the American Railroad Employees and Investors' Association, announces that the association, which is now six months old, has 80 local branches, in which are enrolled 15,000 railway employees and investors. The association is represented by 24 railways.

The White Star Line announces that its vessels between New York and Liverpool will call regularly at Holyhead. Commencing July 10, its steamers will leave Liverpool on Saturdays at 12:30 p.m. instead of starting Fridays, as at present. Passengers from London will start on Saturday at noon.

Memoranda of the amounts stolen daily from the Brooklyn Rapid Transit Railroad by Frederick Lehefeld, a conductor, were read in the County Court at Brooklyn, N. Y., this week, when Judge Dike sentenced Lehefeld to not less than two and a half nor more than five years in Sing Sing state's prison. Figures showed that he had stolen as high as $11.05 a day, and never less than $2.80 a day. It was said that Lehefield had taught other employees to steal.

Governor Hoke Smith, of Georgia, who retired from office last Saturday, June 26, suspended Chairman McLendon, of the State Railroad Commission, on Thursday, the 24th. The avowed reason for this action was Mr. McLendon's refusal to vote for certain freight rate reductions between Savannah and Atlanta, the governor charging that during the campaign McLendon had favored the governor's proposal to have the rates in question reduced. The legislature is now in session, and before that body will come the question of confirming the governor's action.

The St. Louis Southwestern, having been reminded by the Interstate Commerce Commission of its duty to obey the hours of service law, responded with the suggestion that the law should not be enforced until after the question of its validity shall have been decided by the Supreme Court; but the commission referred the communication to Attorney-General Wickersham, and he decides that the law must be obeyed as it stands. It has been sustained by the United States district court for the Northern District of Illinois, and Mr. Wickersham believes that decision to be sound.

Twenty-four Hour Notation in Russia.

Beginning August 1 the telegraph offices in Russia will use 24-hour clocks, the numerals 12 to 23 being used to designate afternoon time.

Canadian Railway Charters.

The Canadian Senate at its last session had before it a bill to vary the methods of incorporating railway companies. The main object of the bill is to incorporate railway companies by means of letters patent, similar to the method adopted with the formation of joint stock companies. The bill provides among other things that the company shall be subject to the Railway Act and any other general act relating to railways, and that within 12 months after publication of the notice of agreement of association, the provisional directors might apply for a certificate that the public interest required that a railway be constructed as proposed. This certificate would determine all such matters as were set out in the articles of association and not provided for by the Railway Act, and the Board of Railway Commissioners is to be given power to grant certain additional powers, as it may deem necessary. Companies proposing to incorporate are not compelled to take advantage of the act. It is anticipated that the adoption of the bill and the passing of it into law will relieve Parliament of a considerable amount of unnecessary work, and would prevent the obtaining of charters for purely speculative purposes. How this latter desirable object is to be achieved did not transpire. A report which was produced in the House of Commons, showed that for the period from 1888 to 1908, inclusive, 203 companies had been incorporated under the Dominion Companies Act with powers to construct railway lines in various parts of the Dominion. Of the charters so granted, 86 have lapsed; the time for construction of lines authorized by 88 has been extended once; of 43, twice, and of 18, three or more times. The total mileage authorized to be constructed was 63,809 miles, and of this amount, only 1,072 miles has actually been constructed, by 25 companies. These figures do not include any relating to the Canadian Northern, Canadian Pacific, Grand Trunk or Grand Trunk Pacific railways.

Government Abandons Suit Against New Haven.

Attorney-General Wickersham has withdrawn the suit which was entered several months ago by the government against the New York, New Haven & Hartford and the Boston & Maine, alleging that the anti-trust law had been violated by the virtual consolidation of the management of these two roads, the New Haven having bought a large amount of stock in the Boston & Maine. The suit is now withdrawn because the state of Massachusetts has passed a law which in effect approves such a consolidation; that is to say, the legislature has authorized the organization of the Boston Railroad Holding Company, which may hold all or any part of the stock and bonds of the Boston & Maine, and the New Haven may hold any amount of stock in the Boston Holding Company. If this law is accepted and acted on, the New Haven company and the Boston Railroad Holding Company both will be bound not to sell any Boston & Maine stock without leave from the state legislature. The government's complaint in the suit also charged illegal restraint of commerce in the control of electric street and interurban lines in Massachusetts by the New Haven, but that question has been settled by the Supreme Court of Massachusetts.

Grand Crossing Track Elevation.

Work on the Grand Crossing track elevation, in Chicago, is to begin at once, the four roads concerned, the Illinois Central, the Lake Shore & Michigan Southern, the Pennsylvania and the New York Chicago & St. Louis having come to an agreement concerning the plans and a division of the cost. The final details of the plans have not yet been arranged, but it is expected that this will be done shortly. The work probably will take 18 months or more.

Bridge Designer for Philippines.

The United States Civil Service Commission announces that applications will be received for consideration in connection with filling vacancies in the position of designer of bridges and buildings of steel and reinforced concrete, in the Philippine service, at a salary of $1,800 to $2,000 a year, according to qualifications. For this position not less than four years' experience in responsible positions is requisite (three years if the applicant is a technical school graduate), of which at least one year must have been in the class of work above specified.

No educational examination will be given for this position, but applicants will be required to file forms setting forth their general and technical education, their general experience and their experience in the special line of work called for, and a technical description of some important engineering work

upon which they have been employed. In addition, they must furnish the names, addresses and occupations of not less than three, nor more than five, persons under or with whom they have worked and who are competent to certify to their general and technical qualification. The age limit is 21 to 40 years on the date of the examination.

Applicants should at once apply to the United States Civil Service Commission, Washington, D. C., for application Forms 2 and 375. Applications must be filed with the commission at Washington by July 21.

A Weather Prediction for A. D. 1925—Rising Temperature and Less Wet.

According to a report issued by the Geological Survey, the great Salton sea, in southern California, will completely disappear through evaporation by the year 1925. The sea, which was formed a few years ago by overflow from the Colorado river into a depression in the Imperial valley, is about 40 miles long and in places 15 miles wide.

The Florida East Coast Extension.

It is planned to complete H. M. Flagler's Florida East Coast Railway to Key West in January, 1910, on the birthday of Mr. Flagler. It is said that part of the construction through deep water cost as high as $1,500,000 per mile. Concrete piers are being built at the rate of one each day by means of a new construction process.

McGraw-Hill Book Company.

The book departments of the McGraw Publishing Company and the Hill Publishing Company have consolidated under the corporate name above given, with office at 239 West Thirty-ninth street, New York. The new company takes over the book departments of both houses with a list of about 250 titles, industrial and college text books, covering engineering in great variety. Its officers are: President, John A. Hill; Vice-President, James H. McGraw; Treasurer, Edward Caldwell, and Secretary, Martin M. Foss. Mr. Hill is head of the Hill Publishing Company, which controls the *American Machinist, The Engineering and Mining Journal, Power* and *The Engineer.* Mr. McGraw is head of the McGraw Publishing Company, which issues the *Electrical World, Electric Railway Journal* and *The Engineering Record.* Mr. Caldwell has been manager of the McGraw book department for several years and Mr. Foss manager of the Hill book department.

Railway Association of Special Agents and Police.

The annual convention was held at Peoria, Ill., June 15 to 17, inclusive. The organization was represented by practically every state and the members took great interest in promoting the welfare of the association. Numerous articles were read relative to the work of railway special agents and police. The next annual meeting will be held in Los Angeles, Cal.

The following were elected officers of the association for the ensuing year: H. H. Germain (A., T. & S. F.), president; M. B. Earle (Sou. Ry.), first vice-president; J. J. Landers (N. Y. Cent.), second vice-president; C. H. Dawson (C., B. & Q.), third vice-president; W. C. Pennell (Chesapeake Steamship Co., Baltimore, Md.), secretary and treasurer.

Meeting of Railway Claim Agents.

At the meeting of the Association of Railway Claim Agents, held in Detroit, Mich., May 26 to 28, there were 112 members present. Eighty-five railways are now represented in the association, 14 having been admitted to membership at this meeting. Each claim department head and such subordinates as investigate and settle claims become members of the association with the admission of their road. The officers for the ensuing year are: President, C. Hoeppner (Mo. P.); Vice-Presidents, C. W. Egan (B. & O.), J. H. Mather (C., R. I. & P.), N. S. Dunlop (C. P. R.), A. F. McConnell (N. C. & St. L.) and D. H. Kimball; Secretary and Treasurer, E. H. Hemus (A., T. & S. F.), re-elected. The next meeting will be held in Nashville, Tenn., in May, 1910.

American Street and Interurban Railway Manufacturers' Association.

The exhibits at the street railway conventions in Denver, Col., will be in the Denver Auditorium and temporary buildings, providing, together, 35,000 sq. ft. of space on the main floor and 6,000 sq. ft. in the balcony. The exhibit committee is working to get a half rate from Chicago, St. Louis and other Missouri river points. It is also considering a proposition to consolidate L. C. L. shipments at Chicago and Newark, N. J. If the plans are successful, freight rates can be made quite low. A lower charge than usual has been agreed on for teaming in Denver. The charge for exhibit space is 30 cents a square foot. Kenneth D. Hequembourg, of the Walker-Bennett Manufacturing Co., New York, is vice-president of the association and represents the exhibit committee.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.
American Association of Demurrage Officers.—A. G. Thomason, Scranton, Pa.
American Assoc. of Local Freight Agents' Ass'ns.—G. W. Dennison, Penna. Co., Toledo, Ohio.
American Institute of Electrical Engineers.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
American Railway Association.—W. F. Allen, 24 Park Place, New York.
American Railway Bridge and Building Association.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
American Railway Engineering and Maint. of Way Assoc.—E. H. Fritch, Monadnock Bldg., Chicago.
American Railway Industrial Association.—R. E. Wilson, Ry. Exchange, Chicago.
American Railway Master Mechanics' Association.—J. W. Taylor, Old Colony Bldg., Chicago.
American Society for Testing Materials.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 29-July 3; Atlantic City.
American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., N.Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
American Street and Interurban Railway Association.—B. V. Swenson, 29 W. 39th St., New York; Oct. 18-22; Denver, Colo.
Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago.
Association of Railway Claim Agents.—E. H. Hemus, A., T. & S. F., Topeka, Kan.
Association of Railway Telegraph Superintendents.—P. W. Drew, Wisconsin Central Ry., Chicago
Association of Transportation and Car Accounting Officers.—G. P. Conard, 24 Park Place, New York.
Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
Canadian Society of Civil Engineers.—Clement H. McLeod. Montreal, Que.; irregular, usually weekly; Montreal.
Central Railway Club.—H. D. Vought, 95 Libery St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo
Freight Claim Association.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.
International Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York.
International Railway Fuel Association.—D. B. Sebastian, La Salle St. Station, Chicago.
International Railway General Foremen's Association.—E. C. Cook, Royal Insurance Bldg., Chicago.
Iowa Railway Club.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month; except July and August; Des Moines.
Master Car Builders' Association.—J. W. Taylor, Old Colony Bldg., Chicago.
New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
North-West Railway Club.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
Railway Club of Pittsburgh.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month; except June, July and August; Pittsburgh.
Railway Signal Association.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.
Roadmasters' and Maintenance of Way Association.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov., 1909; Washington.
St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
Society of Railway Financial Officers.—C. Norquist, Chicago; Sept. 7-8; Fort William Henry, Lake George, N. Y.
Southern Association of Car Service Officers.—J. H. O'Donnell, Bogalusa, La
Southern and Southwestern Ry. Club.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R. R.R., East Buffalo, N. Y.; September, 1909; Denver.
Western Canada Railway Club.—W. H. Rosevear, 199 Chestnut St.; Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
Western Railway Club.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
Western Society of Engineers.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The Wabash Railroad has established a freight station at East Buffalo, N. Y., having made a trackage agreement with the Erie by which its trains can run there from Black Rock.

The Philadelphia & Reading, following a favorable court decision last week, will restore local passenger rates to the basis of 2½ cents a mile. The two-cent rate has been in effect since October 1, 1907.

Wells, Fargo & Company have been awarded the contract for handling Oriental express business on the Chicago, Milwaukee & Puget Sound and the Osaka-Shosen-Kaisha, which will handle Trans-Pacific transportation in connection with this road.

E. B. Lane, formerly Assistant General Freight Agent of the St. Louis, Iron Mountain & Southern, and lately Secretary of the St. Charles (La.) Board of Trade, has accepted the position of traffic expert for the rice merchants of New Orleans, who have formed an association with a view to improving their situation as related to the railways and to railway rates on rice.

The "Lone Star Dispatch" has been chartered in Texas and will have headquarters at Dallas; capital $2,000,000. This corporation proposes to conduct a fast freight line from the North and East to points in Oklahoma, Texas and Mexico. The president is J. H. McDonough, and one of the vice-presidents is E. H. R. Green, president of the Texas Midland.

A despatch from Huntington, W. Va., says that the Chesapeake & Ohio, having secured an injunction from the state court, as heretofore announced, will on July 1 restore its passenger fares in West Virginia to the basis of 3 cents a mile; but the tickets will have coupons entitling the passenger to a rebate of 1 cent a mile in case the final decision of the court shall be adverse to the railway.

"Free Government Land to the Amount of 750,000 Acres Opened to Homestead Settlement" is the attractive headline of a circular which has been issued by the Burlington, announcing to home-seekers that the Flathead, Cœur d'Alene and Spokane Indian reservations, in Montana, Idaho and Washington, are to be opened for entry this summer. Applicants must register between July 15 and August 5, and they are reminded that if they wish to go through from Chicago without change of cars the Burlington is the only line they can take.

R. M. Calkins, traffic manager of the Chicago, Milwaukee & Puget Sound, is quoted in a Seattle paper as saying that Seattle is to be the headquarters of this road in fact as well as in name. Not only are the freight and passenger agents of the new road to report to the office in Seattle but the western business also of the Chicago, Milwaukee & St. Paul will pass through the Seattle office. All agents at Spokane and Tacoma and in cities and towns in North and South Dakota and Minnesota, and even the Oriental agent at Shanghai, China, are notified that their reports henceforth are to go to the Seattle headquarters and not to the Chicago office. A number of officers and office men will be transferred from Butte, Chicago and other points to Seattle.

A conference between representatives of the western railways and of Chicago commercial interests was held at Chicago on June 28, to consider a re-adjustment of rates from Chicago to Texas to meet the low rates by water that are being made by the steamship lines from New York to Texas. The Chicago Association of Commerce was represented by its Traffic Director, H. C. Barlow, and its traffic committee. The railways were represented by J. M. Johnson, vice-president of the Missouri Pacific; E. B. Boyd, assistant to the vice-president of the Gould Lines; George T. Nicholson, vice-president of the Santa Fe, and Theodore Brent, assistant to the third vice-president of the Rock Island-Frisco. The spokesman of the shippers told the railway men that the reductions in ocean steamship rates without corresponding reductions in rates from Chicago to Texas were causing them heavy losses. They are obliged to absorb the difference in rates or else lose their trade. It was stated for the railways that they were feeling the loss of traffic, but that they have been unable to decide what action to take. They fear to reduce their rates because once they were reduced it might be impossible to restore them. Another conference will be held.

Argument in the Missouri River Rate Case.

Final arguments in the suit brought by the western railways to restrain the Interstate Commerce Commission from enforcing its order in the Missouri River rate case were heard by Judges Grosscup, Baker and Kohlsaat in the United States Circuit Court at Chicago on June 23. This is the case in which the Commission ordered the Mississippi-Missouri River proportions of the through rates on goods moving from the Atlantic seaboard to the Missouri River to be made lower than the local class rates from the Mississippi to the Missouri River. The roads attack the principle laid down by the Commission that the through rate should be less than the sum of the local rates over the same line. The Denver case, which involves the same principle, will turn on the decision in the Missouri River case.

The railways were represented in the argument by Colin H. Fyffe and W. D. McHugh. The Interstate Commerce Commission was represented by Luther M. Walter. Counsel for the railways introduced in the Denver case affidavits of James J. Hill, E. P. Ripley and Marvin Hughite, in which it was asserted that enforcement of the Commission's order would revolutionize commercial conditions as well as railway rates throughout the West and do great injury to interests of all kinds. If the principle of the Commission were generally applied it would injure all jobbing centers west of the Atlantic seaboard.

Mr. Walter declared that the railways were making a concerted, insidious attack upon the regulative authority of the Commission—that they had themselves frequently made through rates lower than the combination of local rates and had got rates into such a tangle that the shipper does not know where he is; and if the efforts of the Commission to bring order out of this chaos shall be successfully opposed there can be but one result—government ownership.

INTERSTATE COMMERCE COMMISSION.

The Adams Express Co. transported for complainant three shipments of merchandise from Washington, D. C., to Bremerton, Wash., charging therefor through rates in excess of the sums of the locals. Reparation awarded. (16 I. C. C. Rep. 394.)

Rates on Coarse Garments.

Association of Union Made Garment Manufacturers of America v. Chicago & North Western et al. Opinion by Commissioner Prouty.

The garments manufactured by the members of the complainant association, such as overalls, jackets, shirts of low grades and play suits for children, made of coarse heavy cotton cloth, are classified in the Official, Western and Southern Classification as first class, and the purpose of this proceeding is to obtain a reduction in that rating; but on the facts disclosed by the record the contention is not sustained and the complaint is dismissed.

Estimating Weight of Crates.

Edward G. Davies v. Illinois Central. Opinion by Commissioner Harlan.

The defendant's tariff provided estimated weights for cabbages when shipped in so-called standard crates theretofore in use in the cabbage traffic, but during the spring of 1908 shipments from Louisiana and Mississippi points to Chicago were made in crates of other dimensions. On the special facts shown the complainant is liable for, and the defendant may lawfully collect, freight charges at the published rate per 100 lbs. on the actual weight of such shipments as were received by the complainant, estimated, as was done, by weighing a number of crates in each shipment and thus ascertaining the average weight per crate. Defendant criticised for not having revised its tariffs to conform to the changed conditions.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF APRIL, 1909.
(See also issues of June 4, 11, 18, and 25.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Atlanta & Birmingham Air Line	237	$57,967	$18,657	$81,449	$9,635	$6,913	$71	$30,260	$1,228	$48,107	$33,342	.....	$2,956	$30,386	$22,745
Atlantic & St. Lawrence	167	62,908	21,808	94,800	9,149	10,839	2,526	31,029	2,208	55,751	39,049	.....	6,845	32,204	4,206
Atlantic City	167	54,345	56,428	115,579	24,924	23,762	1,540	57,918	352	108,496	7,083	$3,336*	7,000	3,253†	‡5,428
Bessemer & Lake Erie	201	276,997	19,565	301,716	53,731	81,022	10,011	98,094	6,363	249,221	52,495	.....	6,000	46,495	‡4,464
Chicago Terminal Transfer	90	10,949	2,536	90,802	15,187	24,195	1,078	40,466	5,081	86,007	4,795	858	16,555	10,902†	4,660
Cincinnati & Muskingum Valley	148	48,672	15,948	69,324	15,802	14,617	1,719	25,327	1,406	58,871	10,453	.....	3,420	7,033	‡719
Cleveland, Akron & Columbus	210	113,460	31,704	157,032	23,098	33,169	1,766	49,975	2,984	110,992	46,040	.....	5,000	41,040	7,701
Cleveland, Lorain & Wheeling	194	261,475	15,419	286,261	44,816	36,845	6,366	86,279	5,798	180,104	106,157	.....	9,406	96,751	130,417
Cleveland, Term. & Valley	93	72,978	12,656	91,861	15,944	7,918	1,542	39,221	1,467	66,092	25,769	.....	3,359	22,410	28,617
Cumberland Valley	162	156,083	41,284	206,699	23,570	18,323	3,623	66,668	4,875	117,059	89,640	337	3,713	86,264	8,485
Detroit, Grand Haven & Milwaukee	189	88,893	32,939	138,001	19,498	17,163	4,124	62,765	3,363	106,913	31,088	58*	2,711	28,319	30,180
Duluth & Iron Range	168	109,218	18,921	136,885	32,324	39,503	478	52,636	9,800	134,741	2,144	2,933*	5,436	6,225†	45,068
Elgin, Joliet & Eastern	239	202,541	13	207,925	20,197	31,671	2,977	66,183	7,416	128,444	79,481	.....	10,500	68,981	25,202
Fort Worth & Rio Grande	196	64,942	23,068	93,433	9,568	7,456	3,206	46,074	4,369	70,673	22,760	.....	1,900	20,860	24,249
Georgia	307	145,711	57,851	214,735	28,109	36,463	7,784	100,512	7,434	180,302	34,433	.....	1,123	33,310	28,997
Gila Valley Globe & Northern	125	86,349	9,927	101,248	25,334	11,171	1,271	20,203	2,147	60,126	41,122	.....	1,900	39,222	9,006
Houston, East & West Texas	191	69,025	25,037	99,152	16,861	10,719	1,283	34,984	3,509	57,356	31,796	.....	4,808	26,988	14,834
Indianapolis Southern	179	51,913	17,478	73,451	16,943	9,940	1,021	30,170	1,200	59,274	14,177	.....	2,545	11,632	‡4,077
Lehigh & New England	170	69,909	1,000	71,516	13,503	9,962	1,180	18,411	3,545	46,601	24,915	.....	850	24,065	‡8,344
Louisiana & Arkansas Ry.	226	87,319	12,377	104,030	13,815	15,527	1,775	25,682	4,159	60,958	43,072	.....	1,993	41,079	6,248
Louisville, Henderson & St. Louis	200	50,035	27,200	84,200	23,327	8,316	3,293	28,659	2,692	66,287	17,913	4*	2,500	15,409	2,161
Nevada Northern	165	86,102	12,389	101,239	5,794	8,631	462	19,316	3,035	37,238	64,001	.....	2,775	61,226	37,446
New York, Philadelphia & Norfolk	112	200,936	29,456	244,860	23,472	48,223	3,129	91,548	9,156	175,628	69,232	.....	6,250	62,982	6,824
Pittsburgh, Shawmut & Northern	237	61,306	7,624	70,743	13,243	23,145	1,073	24,447	3,230	65,138	5,605	.....	1,537	4,068	22,648
Richmond, Fredericksburg & Potomac	83	116,976	62,671	201,923	30,147	21,472	2,178	60,514	4,396	118,707	83,216	.....	200	83,016	8,444
Rio Grande Southern	180	30,970	8,899	42,843	9,809	4,328	83	16,720	1,474	32,414	10,429	.....	2,200	8,229	‡6,302
St. Louis, San Francisco & Texas	135	55,816	7,854	67,087	10,217	6,845	2,094	28,838	2,783	50,777	16,310	.....	966	15,344	25,762
Spokane & Inland Empire	168	31,950	38,989	74,729	12,161	7,204	1,865	23,267	6,076	50,573	24,156	8,681	2,250	30,587	10,393
Stephenville, No. & So. Texas	43	3,800	1,451	5,598	586	1,466	292	2,434	665	5,443	155	.....	216	61†	.....
Terminal R.R. Ass'n of St. Louis	26	.....	280	185,503	26,824	11,269	418	61,698	3,929	104,138	81,365	5,317	21,000	65,682	26,061
Toledo, Peoria & Western	248	43,429	27,318	75,441	17,309	19,100	2,072	32,588	3,156	74,225	1,216	.....	4,800	3,584†	593
Ulster & Delaware	129	74,244	16,671	94,058	9,054	11,340	998	36,157	2,310	59,859	34,199	168*	3,000	31,031	1,983
Union R.R. of Baltimore	9	84,499	18,349	104,841	7,675	.....	291	5,004	1,817	14,787	90,054	.....	3,785	86,269	15,365
Virginian	339	59,389	10,229	74,817	16,732	11,800	3,273	26,054	6,752	64,611	10,206	17	5,000	5,223	4,231
Washington Southern	35	38,855	32,538	92,905	8,198	6,069	1,060	33,367	2,246	50,940	41,965	.....	2,345	39,620	29,743
Western Ry. of Alabama.	133	44,785	32,387	86,452	21,646	16,838	4,604	25,645	4,445	73,178	13,274	58*	4,471	8,744	‡5,328
TEN MONTHS OF FISCAL YEAR.															
Atlanta & Birmingham Air Line	237	$556,865	$199,090	$796,543	$112,341	$62,267	$11,412	$306,873	$17,892	$510,785	$285,758	.....	$46,276	$239,482	$86,140
Atlantic & St. Lawrence	167	724,412	236,551	1,065,815	147,850	135,180	30,091	402,776	25,911	741,808	324,007	.....	68,456	255,551	8,803
Atlantic City	167	527,938	722,855	1,309,130	240,340	138,054	15,150	652,871	6,178	1,052,593	256,537	42,333*	70,000	144,204	37,397
Bessemer & Lake Erie	201	4,347,038	249,275	4,649,224	490,112	935,032	64,548	1,306,845	86,360	2,882,897	1,766,327	.....	79,000	1,687,327	‡94,388
Chicago Terminal Transfer	90	85,303	20,853	902,947	130,733	236,676	8,100	422,384	47,094	844,987	57,960	7,949	146,895	80,986†	28,303
Cincinnati & Muskingum Valley	148	488,160	163,126	695,219	126,774	95,586	16,886	267,262	20,007	526,515	168,704	.....	39,256	129,448	‡42,373
Cleveland, Akron & Columbus	210	1,125,945	364,390	1,624,638	200,706	303,311	22,114	529,651	30,020	1,085,802	538,836	.....	60,222	478,614	57,919
Cleveland, Lorain & Wheeling	194	2,625,169	185,364	2,976,547	330,881	536,302	60,869	1,021,373	60,148	2,009,573	966,974	.....	94,064	872,910	‡120,033
Cleveland, Term. & Valley	93	674,526	137,981	868,845	128,806	87,191	14,340	367,176	15,406	612,919	255,926	.....	33,586	222,340	26,779
Cumberland Valley	162	1,498,624	465,469	2,065,133	203,587	197,253	38,187	646,972	54,397	1,140,396	924,737	4,734	37,130	892,341	15,309
Detroit, Grand Haven & Milwaukee	189	804,550	420,127	1,422,782	231,590	157,780	42,788	614,318	39,261	1,085,737	337,045	222*	27,115	309,708	130,439
Duluth & Iron Range	168	4,814,969	190,514	5,075,012	617,867	440,307	4,096	920,529	97,482	2,080,281	2,994,731	840*	205,920	2,787,971	‡172,332
Elgin, Joliet & Eastern	239	2,009,344	475	2,072,396	208,716	324,313	26,263	671,444	75,812	1,306,548	765,848	.....	97,000	668,848	14,271
Fort Worth & Rio Grande	196	682,914	286,009	1,026,103	122,815	90,150	28,577	352,204	46,360	640,106	385,997	.....	11,871	374,126	318,464
Georgia	307	1,657,986	611,616	2,412,230	422,264	360,032	82,943	997,688	71,176	1,934,103	478,127	.....	15,105	463,022	72,321
Gila Valley Globe & Northern	125	692,262	105,581	836,658	220,971	80,221	4,575	180,736	16,180	502,683	333,975	.....	18,493	315,482	‡91,201
Houston, East & West Texas	191	721,672	235,505	1,013,085	182,078	91,048	13,135	335,137	32,097	653,495	359,590	.....	35,292	324,298	84,191
Indianapolis Southern	179	544,364	193,404	778,075	162,671	98,248	11,193	322,639	14,998	609,749	168,326	.....	24,070	144,256	120,748
Lehigh & New England	170	590,373	14,674	616,538	118,924	81,618	8,834	172,865	29,328	411,569	204,969	.....	8,500	196,469	7,611
Louisiana & Arkansas Ry.	226	822,160	129,522	995,408	177,483	183,295	16,191	267,042	43,294	687,305	308,103	.....	15,807	292,296	12,960
Louisville, Henderson & St. Louis	200	490,781	313,262	854,317	177,848	79,899	34,744	282,450	28,979	603,920	250,397	2,231	25,000	227,628	51,848
Nevada Northern	165	726,257	120,661	876,897	65,616	74,754	4,212	172,894	22,729	340,205	536,692	.....	15,451	521,241	24,092
New York, Philadelphia & Norfolk	112	1,855,637	320,342	2,332,820	215,301	423,922	30,624	863,835	103,240	1,636,922	695,898	.....	62,290	633,608	‡43,059
Pittsburgh, Shawmut & Northern	237	593,027	82,411	694,581	121,409	255,673	10,465	249,057	37,043	673,647	20,934	.....	15,458	5,476	102,502
Richmond, Fredericksburg & Potomac	83	843,857	574,952	1,604,991	223,980	217,899	20,339	553,103	44,334	1,059,655	545,336	.....	2,000	543,336	100,437
Rio Grande Southern	180	367,273	91,763	490,756	100,486	33,798	1,105	163,119	16,613	315,121	175,635	.....	23,800	151,835	‡12,534
St. Louis, San Francisco & Texas	135	548,312	88,580	668,746	172,933	89,529	20,082	343,065	30,219	655,819	12,927	.....	9,227	3,700	‡93,568
Spokane & Inland Empire	168	253,235	398,169	691,559	88,594	61,606	19,229	240,398	60,448	470,275	221,284	91,493	19,300	293,477	38,050
Stephenville, No. & So. Texas	43	74,128	15,178	92,760	6,973	9,371	1,785	24,050	5,945	48,124	44,636	.....	1,108	43,528	.....
Terminal R.R. Ass'n of St. Louis	26	.....	2,543	1,940,348	187,954	123,960	4,193	603,310	51,395	970,812	969,536	111,123	213,738	866,921	104,285
Toledo, Peoria & Western	248	550,910	318,986	917,795	154,186	188,175	20,679	352,106	32,711	747,857	169,938	.....	42,000	127,938	1,986
Ulster & Delaware	129	521,789	280,762	842,289	99,865	102,195	10,278	344,342	23,220	579,900	262,389	1,485*	30,000	230,904	100,874
Union R.R. of Baltimore	9	736,259	179,208	933,817	59,794	.....	2,606	49,270	15,057	126,727	807,090	.....	30,622	776,468	‡105,269
Virginian	339	278,010	69,215	377,827	83,945	63,233	18,840	132,071	27,045	325,134	52,693	74	17,600	35,167	79,955
Washington Southern	35	300,154	293,218	768,173	82,374	63,370	8,919	297,848	22,918	475,429	292,744	.....	23,449	269,295	184,032
Western Ry. of Alabama.	133	481,677	351,242	909,303	173,608	153,984	41,739	262,644	41,673	673,668	235,635	1,663*	44,714	189,258	‡8,980

*Deficit. †Loss, ‡Decrease.

Exception to Combination of Locals Rule.

Edward L. Kurtz v. Pennsylvania Company et al. Opinion by Commissioner Prouty.

Complainant, desiring to travel from New Castle, Pa., to New York City via the Pennsylvania Company to Pittsburgh and the Pennsylvania Railroad from Pittsburgh, presented a local ticket from New Castle to Pittsburgh and a mileage book from Pittsburgh to New York for the purpose of securing his berth in a Pullman car; but the agent refused to grant him the Pullman accommodations on the ground that his regulation prohibited him from selling such accommodations except on a through ticket, the cost of which in this case was greater than the combination of locals. Under its tariff the Pullman Co. should have declined, as it did, to sell the through berth to the complainant. While these defendants are within their rights in maintaining their regulation in force in this case, such conditions as the one here developed cannot be permanently permitted, as it is the almost invariable rule of this commission that the through charge must not exceed the combination of locals.

Ton Mile Rate Not Adequate for Comparisons.

Cedar Hill Coal & Coke Co. et al. v. Colorado & Southern et al. Opinion by Commissioner Clements.

Complainants contend that the blanket rates of defendants for coal from the Walsenburg fields, in southern Colorado, to points in Kansas, Nebraska, Oklahoma, Texas and New Mexico, are unreasonable because they cover groups of points too widely separated, and because they are excessive when compared with rates on coal from points in Kansas, Iowa, Missouri, Wyoming, Illinois, Oklahoma and Arkansas, to consuming markets; but on consideration of the circumstances and conditions affecting the coal rates from the Walsenburg district, these rates are not found to be unreasonable or unjust, and the complaints must be dismissed.

The chief reliance for relief in these cases is based on comparisons of the per-ton-per-mile revenue derived by the carriers from the transportation of coal from the Walsenburg district with the revenue per ton per mile from other coal-producing fields; but the rate-per-ton-per-mile rule excludes consideration of other circumstances and conditions which enter into the making of rates, and cannot be accepted as controlling in determining the reasonableness of rates.

Complainants' contentions that defendants' reconsignment rule be superseded by a rule eliminating the 72-hour time limit and permitting the reconsignment of coal at any time on the payment of a uniform charge, plus demurrage, is without merit. The commission has always regarded reconsignment as a privilege, not a right to be demanded by shippers, and has consistently refused to extend the same except to correct unjust discrimination.

STATE COMMISSIONS.

Wisconsin. Error of Shipper.

Joannes Brothers Co. v. Chicago, Milwaukee & St. Paul.

Petition asking for a refund on a shipment of groceries from Green Bay to Hobson, the shipment having been billed to Rhinelander through error on the part of the petitioner, necessitating re-shipping to Hobson, an intermediate point.

The rates collected were the lawful rates and were not unusual or exorbitant, and carriers acting in good faith cannot be held responsible for the errors of shipment. Petition dismissed.

The Canadian Commission.

The Canadian Railway Commission has given a decision on the application of the Dawson Board of Trade for the reduction of freight rates on the White Pass & Yukon. The company contended that the commission had no jurisdiction as the line was partly in American territory. The commission ruled that it was apparent from the traffic agreement and mode of operation that a through route existed between Skagway and Dawson, and that furthermore a recent amendment to the railway act extended the powers of the commission so as to confer jurisdiction in such cases; and consequently it decided against the company on that point. The question of freight rates was left over for further consideration.

Wisconsin. Minimum Carload Weights.

R. W. Crary v. Minneapolis, St. Paul & Sault Ste. Marie et al.

Petition alleging that the advance in the minimum weight on canned goods from 30,000 to 36,000 lbs. made by the western classification committee in July, 1908, is unreasonable and unjust. The relation of the minimum weights to the car supply of the different respondent companies and the distribution of cars according to capacity is discussed. The record shows that petitioner's business is chiefly interstate, and that only two shipments made by him did not reach the required minimum. The testimony also shows that the minimum weight of 36,000 lbs. can generally be loaded without hardship, but during seasons of partial crop failure or other unusual conditions a minimum of 30,000 lbs. would be more satisfactory. In view of these facts the petition is dismissed without prejudice.

Wisconsin. Marking Packages in L. C. L. Shipments.

Southern Wisconsin Cheese Men's Protective Association et al. v. Wisconsin Central et al.

Complaint that rule 27 of western classification Nos. 45 and 46 is unjust and unreasonable in that it compels the marking of every package of cheese with the full name and address of consignee, and that the name and address affords competitors an opportunity of taking away business which it cost money and labor to establish.

Rule 27 as applied to the cheese business imposes an unreasonable and an unnecessary burden on less than carload shippers of cheese and respondents should hereafter refrain from applying such rule to this class of shipments. Action of the commission is not based on the ground that the publication of the full name and address tends to eliminate the middleman and facilitate direct dealing between producer and consumer. No opinion is expressed with reference to the reasonableness of rule 27 as applied to other classes of traffic.

New York. Through Train Schedules.

In re complaint of residents of Marathon against the Delaware, Lackawanna & Western relative to passenger train service.

Where a petition asks that a railway be directed to stop a train at a particular point, the fact that the railway can make the stop and yet keep its scheduled time is not controlling. A railway is entitled in the first instance to schedule its trains as seems to it most advantageous both as to time and stops to be made. The commission should not interfere with this arrangement unless the change asked for will serve the convenience of a considerable number of people and will not inconvenience a greater number; also that it will not seriously interfere with the running of trains and with the general operating plans of the railway considered as an entire system.

Where a community is already well served by a railway it cannot reasonably ask that additional stops be made because some further convenience would be afforded thereby when the railway shows good business reasons for continuing the service complained of.

COURT NEWS.

The Pennsylvania 2-cent fare law passed by the legislature in 1907 has been declared unconstitutional by Judge Willson in Common Pleas Court at Philadelphia. The decision was in the case of the Philadelphia & Reading to restrain the county of Philadelphia from enforcing the law. The county is perpetually enjoined from enforcing the act against the Reading.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Geo. W. Ristine, the president of the Tennessee Central, has resigned.

St. Denis J. De Blanc, who has been performing the duties of secretary and treasurer of Morgan's Louisiana & Texas, has been appointed to that office, succeeding M. B. Bergeron, who retires because of continued ill health. Mr. De Blanc's office will be at New Orleans, La.

F. E. Shallenberger, assistant auditor of miscellaneous records and accounts of the Pennsylvania, with office at Philadelphia, Pa., has been appointed the auditor of the Star Union Line of the Pennsylvania, with office at Pittsburgh, Pa., succeeding John T. Denniston, deceased.

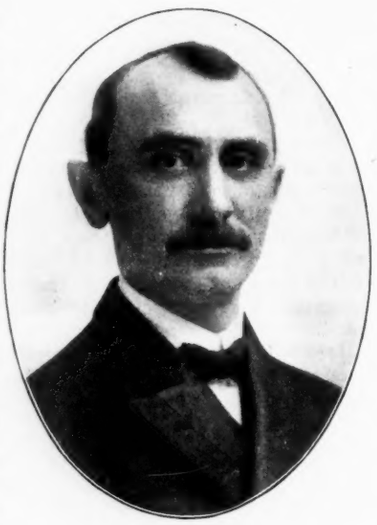
As previously noted in these columns, W. A. Garrett, chief executive officer for the receivers, and L. Sevier, vice-president of the Seaboard Air Line, have resigned, and now both of these offices are abolished. The office of L. G. Haas, agent for the receivers at Baltimore, Md., has been transferred to Portsmouth, Va.

Charles D. Jeffers has been appointed the claim agent, with office at Little Rock, Ark., for the state of Arkansas of the St. Louis, Iron Mountain & Southern, and leased, operated and independent lines, and will have charge of the investigation and adjustment of all claims in this territory excepting those relating to wages and traffic.

Henry T. Wickam, general counsel of the Chesapeake & Ohio, with office at Richmond, Va., has been elected vice-president and general counsel. Charles E. Doyle, general manager, has been elected also vice-president, and F. M. Whitaker, freight traffic manager, with office at Cincinnati, Ohio, has been elected also vice-president.

Operating Officers.

H. B. Earling, whose appointment as general superintendent of the entire Chicago, Milwaukee & Puget Sound, with office at Butte, Mont., has been announced already in these columns, was born on October 30 1862, at Richfield, Wis. He received his education in the Milwaukee public schools. He began railway work in 1879 as a telegraph operator on the Chicago, Milwaukee & St. Paul. He was a train despatcher and a chief train despatcher on this road from 1885 to 1893; trainmaster from 1893 to 1896; superintendent of terminals at Milwaukee, Wis., from 1896 to 1897; superintendent at Milwaukee, Wis., and Marion, Iowa, from 1897 to 1903, and assistant general superintendent at Milwaukee and at Minneapolis from 1903 to 1907. He was general superintendent of the coast line extension of the Chicago, Milwaukee & St. Paul east of Butte while it was under construction, and held this office until his recent appointment as general superintendent of the entire Chicago, Milwaukee & Puget Sound.



H. B. Earling.

John B. Dickson, assistant to the general manager of the Erie at New York, has been appointed the superintendent of the Rochester division, succeeding W. J. Sharp, deceased.

T. J. Hayes, trainmaster on the Peoria division of the Cleveland, Cincinnati, Chicago & St. Louis at Indianapolis, Ind., has been transferred to Bellefontaine, Ohio, succeeding C. W. Buchanan, transferred.

W. E. Costello, superintendent of the Southern division of the Central Vermont, with office at New London, Conn., has had his jurisdiction extended to include the steamships New York and New London of the Central Vermont Transportation Co.

Charles H. Hix, general superintendent of the Seaboard Air Line, has been appointed general manager. He was born in Nelson county, Va., in 1862, and began railway work in 1880 as rodman in the engineering corps of the Norfolk & Western. In the winter of 1881 he was made receiving and delivery clerk at Saltville, and later in the year was made assistant agent and operator, which position he held until 1884, when he became agent at Buford, Va. In 1886 he was appointed relief agent and in 1888 train despatcher at Roanoke. He was made chief despatcher in 1891. In 1897 he was appointed trainmaster of the Radford division. Owing to a change in administration he was again appointed chief despatcher, remaining in that position until July, 1900, when he went to the Seaboard Air Line as trainmaster of the Second division, becoming trainmaster of the First division in June, 1901, and in September superintendent of the First division. In September, 1905, he was promoted to general superintendent, which position he held until his present appointment.

Charles H. Hix.

C. E. Carson, superintendent of terminals of the National Railways of Mexico at Tampico, has resigned to become the manager of the Mexican Fuel Co., with office at Tampico. The fuel company supplies the National Railways with fuel and is also developing new oil fields in various parts of Mexico. Mr. Carson was born in 1867 and began railway work in 1885 on the Kansas City, Fort Scott & Memphis, now part of the St. Louis & San Francisco. He was formerly president of the Central Association of Railroad Officers and has a long experience in railway work. His first important work was as assistant superintendent of the Terminal Railroad Association of St. Louis from 1893 to 1897. He then became superintendent of the Missouri Pacific at Kansas City and St. Louis, leaving that position in 1903 to go to the Colorado & Southern as superintendent of the Northern division, including the Denver terminals. He returned to the Missouri Pacific three years later as superintendent at Kansas City, which position he held until May, 1908, when he went to the Mexican Central as superintendent of terminals at Tampico, having in charge also the ocean business, including the stevedoring and handling of vessels.

Traffic Officers.

Frank A. Curry has been appointed commercial agent of the Lake Erie & Western at Buffalo, N. Y.

The office of J. H. Hackett, division freight agent of the Erie, has been transferred from Galion, Ohio, to Akron, Ohio.

George W. Hibbard has been appointed the assistant general passenger agent of the Chicago, Milwaukee & Puget Sound, with office at Seattle, Wash.

W. M. Orr has been appointed a commercial agent of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, with office at Charlotte, N. C.

C. M. Fowler, contracting freight agent of the Spokane, Portland & Seattle at Portland, Ore., has been appointed a traveling freight and passenger agent. C. S. Hanawalt succeeds Mr. Fowler.

C. R. Capps, the general freight agent of the Seaboard Air Line at Norfolk, Va., has been appointed the freight traffic manager, with office at Norfolk, reporting to L. G. Haas, agent for the receivers.

W. D. Carrick, the general baggage agent of the Chicago, Milwaukee & St. Paul, has been appointed also the general baggage agent of the Chicago, Milwaukee & Puget Sound. His office will continue to be at Milwaukee, Wis.

J. G. Hollenbeck, general agent, Passenger department, of the Missouri Pacific at Cincinnati, Ohio, has been appointed an assistant general passenger agent, with office at Little Rock, Ark. J. A. Steltenkamp, traveling passenger agent at Louisville, Ky., succeeds Mr. Hollenbeck.

W. C. Bowles, general freight agent of the Canadian Pacific at Winnipeg, Man., has been transferred as general freight agent to Vancouver, B. C., succeeding W. R. Haldane, resigned on account of ill health. R. W. Drew has been appointed the acting general freight agent of the Kootenay & Boundary district, with office at Nelson, B. C., succeeding R. E. Larmour, transferred.

C. W. Strain, general passenger and ticket agent of the St. Louis, San Francisco & Texas and the Fort Worth & Rio Grande, and assistant general passenger agent of the Paris & Great Northern, whose appointment was recently announced in these columns, has been appointed also general passenger agent of the Colorado, Southern, New Orleans & Pacific and the Beaumont, Sour Lake & Western, with office at Fort Worth, Texas. Roy Terrell, general freight and passenger agent of the Colorado, Southern, New Orleans & Pacific and the Beaumont, Sour Lake & Western, will hereafter be general freight agent.

E. M. Snyder, whose appointment as assistant freight traffic manager of the Central of New Jersey was recently announced in these columns, was born May 3, 1866, at Slatington, Pa. He was educated in private schools at Mount Joy, Pa., and in 1882 began railway work as telegraph operator on the Central of New Jersey; from July, 1890, to September, 1898, he was rate clerk in the division freight agent's office, and during the last four months of 1898 was acting division freight agent. He was made division freight agent in January, 1899, and was appointed general freight agent in January, 1904, becoming assistant freight traffic manager in June, 1909, which position he held until his recent appointment at New York.

Engineering and Rolling Stock Officers.

B. D. Lockwood, mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis at Indianapolis, has resigned to become assistant chief engineer of the Pressed Steel Car Co.

J. C. McVea has been appointed an acting resident engineer of the Houston East & West Texas and the Houston & Shreveport, with office at Houston, Texas, succeeding E. M. Moursund, resigned to go with another road.

J. T. Connor, acting superintendent of motive power and machinery of the Houston East & West Texas and the Houston & Shreveport at Houston, Texas, has been appointed the superintendent of motive power and machinery.

D. W. Fitzgerald, master mechanic of the Galveston, Harrisburg & San Antonio at El Paso, Tex., has been appointed the assistant general superintendent of motive power of the St. Louis & San Francisco, with office at Springfield, Mo.

F. W. Hawks, division engineer of the Virginian Railway, has been appointed assistant chief engineer of the Yunnan-Szechuan & Teng Yueh Railway of China, and will sail on July 20 with W. S. Dawley, chief engineer, whose appointment was mentioned June 18.

L. W. Stubbs, resident engineer of the Houston & Texas Central at Ennis, Tex., has been appointed the consulting engineer, with office at Houston, Tex. E. M. Moursund, resident engineer of the Houston East & West Texas and the Houston & Shreveport at Houston, Texas, succeeds Mr. Stubbs.

James Kiely, master mechanic of the New Mexico division of the western lines of the Atchison, Topeka & Santa Fe, with office at Raton, N. Mex., has been appointed the master mechanic of the Rio Grande division, with office at Clovis, N. Mex., succeeding Thomas Booth, granted an indefinite leave of absence. John A. Conley succeeds Mr. Kiely.

D. K. Ingen, assistant district engineer of the New York Central & Hudson River at Syracuse, N. Y., has had his office moved to Corning, N. Y., and will be in charge of the territory of the Pittsburgh division. H. L. Preston, assistant engineer at Syracuse, is appointed assistant district engineer, with office at Syracuse, in charge of the following territory: Western division, main line, Minoa, N. Y., to west end of yard at Lyons; Western division West Shore, DeWitt to west end of yard at Lyons; Auburn road, Syracuse to east end of yard at Canandaigua; Ontario division, west of Richland to east end of yard at Wallington, and the Chenango branch.

G. W. Robb, whose appointment as master mechanic of the Grand Trunk Pacific at Rivers, Man., was recently announced in these columns, began railway work in 1880 as car repairer on the Grand Trunk and was later clerk at Chaudiere Junction. In 1881 he became apprentice in the erecting shops at Montreal, and the following year went as apprentice to the roundhouse at Brockville. In 1884 he became machinist's improver in the Northern & Northwestern Railway repair shop at Toronto, and in 1885 became machinist in the general shops of the Canadian Pacific at Winnipeg. In 1887 he was made locomotive foreman of roundhouse at Breckenridge, Minn., and later became locomotive foreman on construction during the construction of the Great Northern from Minot, N. Dak., to Great Falls, Mont. Later in that year he was appointed locomotive foreman of the Chicago Great Western at Des Moines, Iowa. In 1890 he became general foreman of the erecting shops of the Canadian Atlantic at Ottawa, and in 1905, when the shops at Ottawa were taken over by the Grand Trunk, he was retained as general foreman, which position he held until his recent appointment.

G. W. Robb.

OBITUARY.

W. F. Elrod, assistant superintendent of the Toledo & Ohio Central, with office at Bucyrus, Ohio, died June 25 after an operation for tonsilitis.

E. H. Millington, superintendent of telegraph for the past seven years of the Michigan Central at Detroit, Mich., died at St. Thomas, Ont., June 22, following an attack of paralysis.

Major Frederick Bush, formerly president of the Columbia & Greenville, died at Springfield, Mass., June 24, at the age of 89. Major Bush formed a syndicate to buy the property of the Columbia & Greenville after the Civil War, and rebuilt part of it and reorganized it and later sold it to the South Carolina Railroad, which road was later taken over by the Southern Railway.

Oren S. Wood, the well-known veteran telegraph builder, died at his home in Turner, N. Y., June 22, at the age of 91. Mr. Wood was an operator on the original telegraph line between Baltimore and Washington, and he opened the first telegraph office in New York City, which was at Hanover street and Exchange place. Mr. Wood built the first line between New York and Philadelphia, and took part in the building of other lines in New York and elsewhere. For many

years he was Superintendent of the Montreal Telegraph Company.

Fred M. Richardson, car accountant of the Fort Worth & Denver City, with office at Fort Worth, Tex., died June 20 at the age of 44. He was born in Corinth, Vt., in 1864, and began railway work in 1883 in the car accountant's office of the Chicago, Rock Island & Pacific at Chicago. Three years later he went to the Burlington & Missouri River, now part of the Chicago, Burlington & Quincy, at Lincoln, Neb., and in 1888 entered the service of the Northern Pacific, Denver & Gulf, at Denver, Colo., as assistant yardmaster. He was appointed car accountant of the Fort Worth & Denver City in 1890, which position he held until his death.

C. C. Reynolds, general manager of the Terre Haute, Indianapolis & Eastern Traction Company, died at his home in Indianapolis June 26. He was born in Vernon, Ind., May 1, 1859, and began railway work at the age of 16 with the Cleveland, Cincinnati, Chicago & St. Louis as telegraph operator, and later became train despatcher and then superintendent of the St. Louis division, which position he held for 12 years. Since leaving the C., C., C. & St. L. he has been superintendent of the Erie and general manager of the Illinois Valley Traction. In 1903 he was made general manager of the Indianapolis & Northwestern Traction Company, and later when the road was merged into one system by the McGowan syndicate, was made general manager of the entire system, which position he held until his death.

George S. Gatchell died at Canandaigua, N. Y. He was born at Wheatfield, N. Y., in 1847, and received his education at the Lockport Union School. When he was 16 his family moved to Philadelphia, and during the Civil War he served with the Third Pennsylvania Cavalry and was mustered out in 1865 as Sergeant Major of the Fifth Pennsylvania Cavalry. He began railway work as rodman on the Buffalo & Washington, now part of the Pennsylvania. He was engaged for a number of years on the surveying staff of various roads in western New York and Pennsylvania, and in 1872 was appointed chief engineer of the Buffalo & Washington. When the name of the Buffalo & Washington was changed to the Western New York & Pennsylvania he was appointed general superintendent, which positon he held from 1879 to 1889, when he became general manager of the Buffalo Elevating Co. He was widely known throughout western New York and was at one time commissioner of public works in Buffalo. He was a man of genial disposition and was actively associated with many of Buffalo's leading social organizations.

FOREIGN RAILWAY NOTES.

Business is looking up in Germany, where freight earnings in March were slightly greater the last year, having been much less for several months, and it was not always easy to provide cars. There has been also a greater demand for coal and iron.

Since the acquisition by the State of the principal private railways in Japan, there remains five lines, each from 33 to 56 miles long, and aggregating 213 miles, worked by companies, and 45 short lines, with an aggregate of 237 miles. There are about 4,000 miles of state railways.

The Japanese have built hotels of European design at four stations on the part of the South Manchurian Railway which they work. The railway company manages them directly on the European plan—food, drinks and all. There is one at Dairen terminus (which the Russians called Dalny), one at Port Arthur, one at Mukden and one at Kwang-cheng-tze, where the Russian section of the road begins.

The Gotthard railway passed into the hands of the Swiss State railway administration May 1. The negotiations as to the amount to be paid to the shareholders were still pending, but it was believed that the two parties would agree upon a price without resorting to the courts. The question of the great subsidies advanced by Germany and Italy also remains to be settled. These countries have the same rights with the confederacy that they had with the company.

Railroad Construction.

New Incorporations, Surveys, Etc.

Amazon Pacific.—Incorporated in New Jersey, with $1,000,000 capital. Incorporators include H. L. Crawford, Rumson, N. J.; A. W. McCune and C. K. McCormack, both of Salt Lake City, Utah; J. W. Decker, 51 West Fifty-fourth street, and F. P. Delafield, 121 East Seventy-fourth street, New York.

Asherton & Gulf.—According to press reports, this road is now in operation from Artesia, Tex., west to a point on the I. & G. N., at Asherton, in Dimmit county, 32 miles. (March 19, p. 651).

Atchison, Topeka & Santa Fe.—An officer of the Pecos & Northern Texas writes that contracts were let June 5 to the C. H. Sharp Contracting Co., of Kansas City, Mo., to A. Moore, of Newton, Kan., and F. H. Harris, of Amarillo, Tex., for grading and bridges on 176 miles from Coleman, Tex., northwest through Buffalo Gap, Sweetwater, Snyder and Post City to Lovett. The line will cross the Abilene Southern near Buffalo Gap, Taylor county, and the Texas & Pacific and the Kansas City, Mexico & Orient near Sweetwater.

Work is now under way from Plainview, Tex., south through Hale and Lovett counties, to Lovett, 47 miles. Contracts let to A. Moore and F. H. Harris. (June 25, page 1545).

Cherryvale, Oklahoma & Texas.—Present plans are said to provide for building about 1,025 miles of main line, with 525 miles of branches. The proposed main line is to run from Cherryvale, Kan., southeasterly across Oklahoma, via Pawhuska, to Geary, thence to El Paso, Tex., with a 150-mile branch from Caney, Kan., southeast to Fayetteville, Ark., reaching forest lands and mining property in eastern Oklahoma and Arkansas. S. M. Porter, president, Caney, Kan.

Colorado & Southern.—According to press reports, the Colorado Railway, incorporated in Wyoming with $1,000,000 capital to build branch lines for the Colorado & Southern, has applied to the city of Cheyenne, Wyo., for a franchise to lay tracks across Capitol avenue, the present terminus of the Holdrege-Cheyenne line of the Chicago, Burlington & Quincy, Ferguson, Eddy, Thomas, O'Neil and Bent streets to Reed street. The company has bought property abutting on the south side of the alley between Sixteenth and Fifteenth streets. If the franchise is granted work is to be started at once. (May 7, p. 1007.)

Colorado Railway.—See Colorado & Southern.

Derma, Pittsboro & Calhoun County.—Incorporated in Mississippi to build from Derma, on the Mobile & Ohio, north to Pittsboro, about 10 miles. S. H. Lawrence and J. A. Harrison, of Derma, and J. C. Kincannon, of Tupelo, are said to be interested.

Fort Smith, Arkoma & Southwestern.—According to press reports this company has been organized in Oklahoma to build from the Arkansas state line at Fort Smith southwest through Le Flore, Haskell and Latimer counties, Oklahoma, to Wilburton, about 65 miles. A. J. Yorke, Pres.; F. Brown, V.-Pres.; E. D. Bedwell, Secy.

Garden City, Gulf & Northern.—According to press reports the work on this line, projected from Plains, Kan., north via Garden City and Scott to Saint Francis, about 225 miles, is being carried out by the Kansas Construction & Irrigation Co. B. M. McCune, Pres. Contracts are also let as follows: Grading, to Hopkins & Renick, Garden City; concrete work, F. E. Morgan, Garden City; cement and building materials, Jackson-Walker Co., Wichita, Kan.; crossties and lumber, McShane Lumber Co., Omaha, Neb.; rails and track accessories, to the Colorado Fuel & Iron Co., Denver, Colo. (May 21, p. 1099.)

Grand Trunk Pacific.—Contracts are said to be let to McMillan Brothers & Kenny, of Winnipeg, Man., for building 100 miles from Melville, Sask., southwest to Regina, and to Rigby & Hyland, also of Winnipeg, for 30 miles, from Melville northeast to Yorkton. (June 11, p. 1229.)

According to reports the work on District F, being done by J. D. McArthur, of Winnipeg, Man., from a point near Win-

nipeg east to Peninsula Crossing near the junction point of the Fort William branch, will be finished in July.

KANSAS CITY, LAWRENCE & TOPEKA (Electric).—Incorporated in Kansas with $1,000,000 capital and headquarters at Rosedale, to build from Topeka, Kan., east to Kansas City, about 75 miles. The incorporators include R. W. Hocker, J. A. Stewart, F. P. Dickson, and F. B. Glover, all of Kansas City, Mo., G. Holsinger, of Rosedale, R. O. Larson, and D. B. Johnson.

KENTUCKY ELECTRIC.—Incorporated in Kentucky, with $10,000 capital, to build from Providence, Ky., in Webster county, south to Dawson Springs, 20 miles. Construction work is to be started at once. Incorporators include B. H. Romey, J. T. Edwards, W. G. Romey, M. E. Edwards, S. Hicks and M. S. Romey, all of Providence, and B. Sisk, of Silent Run.

KENTUCKY ROADS.—The Rockcastle Lumber Co., a subsidiary of the Tug River Lumber Co., of Bristol, Tenn., is said to be building 13 miles of narrow gage line from Meek, Ky., on the Chesapeake & Ohio, east to Timberlands on Rockcastle creek. About 10 miles of grade is finished and 52-lb. rails laid on three miles. The line is expected to be ready for operation August 1. C. L. Ritter, President, Huntington, W. Va.

LAKE ERIE & YOUNGSTOWN (Electric).—According to press reports, construction work is to be started in July on this line, projected from Conneaut, Ohio, south via Andover to Youngstown, about 60 miles. J. H. Ruhman, of Youngstown, is interested. (Mar. 19, p. 655.)

LEMHI & SALMON VALLEY.—See Oregon Short Line.

MEXICAN ROADS.—A concession has been granted to the Cananea Consolidated Copper Co., controlled by the Cole-Ryan interests, to build about 250 miles of railway from Imuris, on the Sonora branch of the Southern Pacific, south of Nogales, to a connection with the Mexican Central at Candelaria, about 50 miles south of El Paso, Tex., thence through the Cananea mining district, via Agua Prieta. L. D. Ricketts, general manager of the copper company, is quoted as saying that surveys are being made and bids for the construction work are being received. The line is to be laid with 80-lb. rail and have grades of less than 1 per cent.

A concession has been granted to Ed. Hartmann and associates by the Mexican government to build along the Rio Grande border between the Mexican Central and Mexican International railways, about 450 miles. Some surveys are made and construction work is expected to be started soon. Governor Enrique Creel, of Chihuahua, is said to be interested.

According to a consular report a concession has been granted by the Mexican government to build a line from a point on the Mexican International, in the state of Coahuila, to the coal fields in the district of Rio Escondido, with a number of branches. The line is to be built within 15 months.

A concession, also a subsidy of $200,000, has been granted by the Mexican government to Manuel S. Decorbera, of Mexico City, to build from Vera Cruz, Mex., north to Tampico. It is understood that Mr. Decorbera will visit New York to interest capitalists and railway builders.

MONTANA, IDAHO & PACIFIC.—According to press reports from Missoula, Mont., maps have been filed for 20 miles of this proposed line. The route shown is from near the Buckhouse bridge, thence south of the town of Lolo, Mont., and for 14 miles west up the Lolo river. The company was organized to build from Lapwai junction, Idaho, east to the clear water section of Idaho and the Lolo pass of the Bitter Root mountains to Missoula and eventually east to Butte. J. H. Richards, Pres.; J. W. Wilson, Secy., and G. W. Boschke, Ch. Engr. (May 14, p. 1051.)

NORFOLK & WESTERN.—Arrangements have been made to start work at once, jointly by this company and the Atlantic Coast Line, on a line from the Norfolk & Western at Winston-Salem, N. C., south to a connection with the Atlantic Coast Line at Wadesboro, 90 miles. Such a line would provide a short route from Charleston, through the Pocahontas coal fields, to Cincinnati, and by other roads to points north. The new line is to be owned jointly by the two roads, and is to be nearly a straight line. See mention of this project in another column.

OHIO ROADS (ELECTRIC).—Vernon Ewing, associated with the Dayton (Ohio) Chamber of Commerce, and residents of Randolph township are back of a project to build a line north of that place to connect the Dayton, Covington & Piqua with the Dayton & Northern at a cost of about $150,000.

OKLAHOMA CITY JUNCTION.—Incorporated in Oklahoma, with $100,000 capital, to build from a point on the Missouri, Kansas & Texas to a connection with the Chicago, Rock Island & Pacific, about 10 miles. The incorporators include T. E. Wilson, of Morris & Company; E. F. Bisbee and C. M. Macfarlane, all of Chicago; D. T. Flynn and C. B. Ames, of Oklahoma City.

OREGON SHORT LINE.—Press reports say that this company has incorporated the Lemhi & Salmon Valley in Idaho, with $5,000,000 capital, to build from Cerro Grande, Idaho, on the Oregon Short Line, northerly through the valleys of Birch creek and the Lemhi river to Salmon City, thence northerly and westerly along the valley of the Salmon and Snake rivers to Lewiston, 428 miles, with a branch from Salmon City south to Challis, 52 miles; also from a suitable point to Grangeville, and from the main line near Kaufman southeast to the Oregon Short Line, between Market Lake and Camas station.

OTTAWA & ST. LAWRENCE (ELECTRIC).—Organized to build from Ottawa, Ont., southeast via Metcalf, Kenmore, Vernon, Ormond, Winchester, Case Bridge, Winchester Springs and Williamsburg to Morrisburg, thence southwest along the north shore of the St. Lawrence river via Iroquois, Cardinal, Prescott and Maitlands to Brockville, thence northwest via Perth to Lanark, thence north via White Lake to Arnprior and easterly via Fitzroy Harbor to Ottawa, 201½ miles, with branches from Morrisburg for 30 miles, from Kenmore to Russel, 3½ miles, and from Darling to High Falls, 15 miles. Surveys not yet made. It is expected that construction work will be started this year. The estimated cost of the line is $3,000,000. A. H. N. Bruce, Ch. Engr., Ottawa.

ROME & NORTHERN.—An officer writes that a contract has been given to Burke & Joseph, of Cape Girardeau, Mo., to build from Rome, Ga., northward. It is not yet determined to what point on the north the line is to be built. The maximum grade on the section under contract will be 1 per cent. and the maximum curves 5 deg. There will be a few small bridges. (June 11, p. 1230.)

TEXAS CENTRAL.—See Texas Roads.

TEXAS ROADS.—According to press reports, surveys have been made by C. H. Shannon, of St. Louis, Mo., for an 18-mile line from a point on the Texas Central to new coal fields in Stephens county. Inducements are being made to the Texas Central to build the line.

WESTERN PACIFIC.—An officer writes that there remains something over 200 miles of main track yet to be laid, which it is expected will be finished before October 1 to complete this line from Salt Lake City, Utah, west to Oakland, Cal., 923.7 miles. Grading in Nevada is about finished, and the only work of that kind of any magnitude remaining to be done is in the Sierra Nevada mountains, where progress has been slow on account of the character of the work and the obstacles encountered. Track laying is now under way at four different points and is being pushed vigorously except at one point in the mountain, where there will be some delay on account of bridges to be put in when the track reaches that point. Ballasting has been following the track laying closely and there will be little delay in opening the line for traffic on this account.

WEST SHORE.—An officer writes that it is proposed to reconstruct this road between Churchville, N. Y., and East Buffalo, reducing the eastbound gradient to a maximum of 13.2 ft. per mile, replacing the double tracks with new and heavier rails, and putting the line in first-class condition for handling heavy eastbound freight traffic. The improvements will permit the hauling of heavier trainloads, and do away with the pusher service, now necessary between Buffalo and Byron for both eastbound and westbound traffic.

WICHITA FALLS & NORTHWESTERN.—See Wichita Falls Route.

WICHITA FALLS ROUTE.—An officer writes that work is being pushed on the extension of the Wichita Falls & Northwestern from Frederick, Okla., northwest to Altus, 27 miles. Work was recently started on a further extension of 20 miles from Altus northwest to Mangum. (March 19, p. 659.)

Railroad Financial News.

Atlantic & Lake Superior.—Stockholders of the Quebec Oriental Railway are to vote on July 22 on a proposal to buy the railway property of the Atlantic & Lake Superior, extending from Matapedia, Que., to Paspebiac, about 100 miles. The stockholders will also be asked to authorize an issue of bonds or debenture stock to the extent of $45,000 per mile of line that the company may acquire or build.

Chicago Railways.—A number of banking houses, including the National City Bank, New York, have bought and resold $5,000,000 first mortgage 5 per cent. bonds of 1907-1927 of the Chicago Railways. The offering price to the public was 101. The amount now outstanding, including the bonds just sold, is $19,000,000.

Cuba Railway.—An initial quarterly dividend of 1½ per cent. on the outstanding $10,000,000 6 per cent. non-cumulative stock has been declared payable August 2. The company operates 428 miles of standard gage railway, the main line running from Santa Clara to Santiago.

Denver, Boulder & Western.—This company has taken over the property of the Colorado & Northwestern and has made a mortgage securing $800,000 bonds, of which $700,000 are to be issued to pay for the property and the remaining $100,000 may be issued subsequent to January 1, 1910, to pay for extensions and betterments and for additional rolling stock.

Erie.—J. P. Morgan & Co., New York, bought for cash previous to July 1 the coupons due July 1 from the $35,000,000 prior lien 4 per cent. bonds; $35,885,000 general lien 4 per cent. bonds; $3,396,000 New York, Lake Erie & Western Docks & Improvement Co. 6 per cent. bonds, and $1,500,000 Buffalo & Southwestern first mortgage 5 per cent. bonds, and $1,000,000 Buffalo & Southwestern division second lien 5 per cent. bonds. The bankers are also buying at par for cash car trust certificates, series L, of July 1, 1907-July 1, 1909.

It is reported that E. H. Gary, president of the United States Steel Corporation; L. F. Loree, president of the Delaware & Hudson; George W. Perkins, a member of the firm of J. P. Morgan & Co., and R. S. Lovett, counsel for the Union Pacific, are to be elected directors of the Erie.

The New York Public Service Commission, Second district, has approved the issue of $1,000,000 4 per cent. general lien bonds of 1895-1996. These bonds are to be pledged as additional security for the $15,000,000 6 per cent. collateral bonds of 1908-1911.

Quebec Oriental.—See Atlantic & Lake Superior.

Southern Pacific of Mexico.—This company, organized under the laws of New Jersey, took over on June 24 the operation of the Southern Pacific lines in Mexico, aggregating 1,537 miles. The authorized stock is $75,000,000, all of one class, and it is understood that a mortgage securing $75,000,000 bonds is to be issued to reimburse the Southern Pacific will later be made.

Third Avenue, New York.—The following plan has been submitted to the New York Public Service Commission, Second district, by the bondholders' protective committee, J. N. Wallace, chairman: First refunding mortgage 4 per cent. bonds of 1909-1959 to be issued to the amount of $40,000,000, of which $16,516,800 to be issued at once; cumulative 5 per cent. adjustment mortgage bonds dated July 1, 1909, to be issued to the extent of $31,048,000 and $20,000,000 stock is to be sold. Present stockholders are to be assessed 25 per cent. and given in exchange for their stock 125 per cent. in new stock. Present holders of the consolidated bonds are to receive in exchange for the principal of their holding 20 per cent. in new first refunding 4s and 80 per cent. in cumulative adjustment 5s, and for unpaid interest 80 per cent. in first refunding 4s.

Western Pacific.—We are informed that about $17,000,000 second mortgage 5 per cent. bonds have been sold so far. The total authorized issue is $25,000,000. (Sept. 25, 1908, p. 1028.) (See also this road under Railroad Construction.)

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Monongahela is in the market for three or four locomotives. This item is not confirmed.

The Buffalo, Rochester & Pittsburgh is said to be in the market for locomotives. This item is not confirmed.

The Atchison, Topeka & Santa Fe has ordered 4 Mallet compounds and 18 Pacific locomotives. Of the Mallet engines, 2 will be for passenger and 2 for freight service.

CAR BUILDING.

The Great Northern is in the market for 1,000 box cars.

The Reading has ordered 500 steel cars from the Standard Steel Car Co.

The Harriman Lines have ordered 184 passenger cars from the Pullman Co.

The Atchison, Topeka & Santa Fe is in the market for about 140 passenger cars.

The Atlantic Coast Line is asking prices on 500 thirty-ton and 25 forty-ton freight cars.

The Long Island has ordered 100 all-steel passenger coaches from the American Car & Foundry Co.

The Buffalo, Rochester & Pittsburgh is said to be asking prices on 1,000 gondola or hopper cars. This item is not confirmed.

The Baltimore & Ohio is said to be figuring on 3,500 freight cars in addition to the 70 passenger coaches previously mentioned in the *Railroad Age Gazette*. This item is not confirmed.

The Central of New Jersey, mentioned in the *Railroad Age Gazette* of June 4 as asking prices on 1,500 gondola and coal cars, has ordered 500 gondola cars from the American Car & Foundry Co. and 1,000 hopper cars from the Standard Steel Car Co.

The Atlantic Coast Line, reported in the *Railroad Age Gazette* of March 12 as being in the market for two combination mail and express cars, has ordered this equipment from the Harlan & Hollingsworth Corporation. These cars will be equipped with the combination heating system by the Gold Car Heating & Lighting Co., New York.

The Ann Arbor, as reported in the *Railroad Age Gazette* of June 18, is in the market for 500 flat bottom drop 50-ton coal cars. These cars will weigh 40,000 lbs. and will measure 9 ft. 3 in. wide, 40 ft. long and 4 ft. 6 in. high inside. The special equipment includes the following:

Journals	5½ in. x 10 in.
Couplers	Simplex
Draft gear	Miner tandem; Class G Springs
Axles	Open-hearth steel; Block-Pollak Iron Co.
Bolsters, body and truck	Steel; Pittsbh or Am Stl. Fdries
Trucks	Pittsburgh Cast Steel or Andrews
Brake-beams	Monarch
Brake-shoes	Steel back; Railway Materials Co.
Brasses	National-Fulton
Journal boxes	McCord
Paints	Hardy Paint & Varnish Co.
Side bearings	Roller
Springs	Railway Steel-Spring Co.
Wheels	Cast iron, 33-in. Griffin

IRON AND STEEL.

The Wichita Falls & Northwestern has ordered 5,000 tons of rails from the Carnegie Steel Co.

The Colorado & Southern has ordered 150 tons of structural steel from the Wisconsin Bridge Co.

The Illinois Central has ordered 100 tons of structural steel for bridge building from the American Bridge Co.

The Indianapolis, St. Paul & Sault Ste. Marie has ordered 2,400 tons of rails from the Lackawanna Steel Co.

The Iowa Central has ordered about 200 tons of structural steel from the McClintic-Marshall Construction Co.

The St. Louis Southwestern, reported in the *Railroad Age Gazette* of May 7 as being in the market for rails, has ordered 17,000 tons from the Illinois Steel Co.

The Sheboygan Light, Power & Railway Co., reported in the *Railroad Age Gazette* of June 18 as being in the market for 500 tons of 60-lb. rails, has ordered these rails from the Lackawanna Steel Co.

The Harriman Lines have ordered 80,000 tons of rails from the Illinois Steel Co., 12,000 tons from the Carnegie Steel Co., 19,000 from the Tennessee Coal & Iron Co. and 22,000 tons from the Colorado Fuel & Iron Co.

The Seaboard Air Line has ordered 5,500 tons of 75-lb. Dudley section Bessemer rail from the Maryland Steel Co., and 6,500 tons of the same section, but open hearth steel, from the Tennessee Coal, Iron & Railroad Co.

The Peoria & Pekin Union, reported in the *Railroad Age Gazette* of May 28 as being in the market for about 1,500 tons of structural steel for bridge work, has ordered 2,000 tons from the McClintic-Marshall Construction Co.

The Buffalo, Rochester & Pittsburgh has ordered 1,000 tons of 90-lb., A. S. C. E. section, Bessemer rails from the Lackawanna Steel Co., and 500 tons of 90-lb., A. S. C. E. section, open hearth rails from the Carnegie Steel Co.

The Chicago, Milwaukee & St. Paul has ordered about 500 tons of steel for the Bear Creek viaduct in Idaho from the Milwaukee Bridge Co.; about 800 tons for the Renslow viaduct in Washington from the Pennsylvania Steel Co., and 600 tons for the Dominion Creek viaduct in Montana from the Riter-Conley Co. These steel requirements were referred to in the *Railroad Age Gazette* of June 25.

RAILROAD STRUCTURES.

BONHAM, TEXAS.—The Texas & Pacific will build a new 12-stall roundhouse and also new machine shops.

BROWNWOOD, TEXAS.—It is said that the Colorado, Gulf & Santa Fe will build a passenger station to cost about $25,000. (Jan. 15, p. 141.)

BUFFALO, N. Y.—An officer of the New York Central & Hudson River writes that land has been bought at Urban street, Buffalo, on the Belt line, and excavation work is now under way for the elimination of the crossing at that place. It is proposed to put in team tracks and build a freight house.

CHICAGO.—The newspapers of Chicago have recently printed a great deal about a projected new passenger station and terminals for the Chicago & Western Indiana and the railways that get an entrance to the city over its tracks. The facts about the matter may be stated very briefly: Some time ago a committee of directors composed of F. A. Delano (Wabash), J. W. Kendrick (Santa Fe) and W. H. Lyford (C. & E. I.) was directed to have tentative plans made for a new station and terminals. Westinghouse, Church, Kerr & Co., acting under the directions of this committee, prepared and have submitted to the directors five different general plans, none of which has been adopted. Land in addition to that now owned by the Chicago & Western Indiana will be needed, no matter which plan is adopted, and therefore has been bought. The fact that the Wabash enters the Polk street station and that its president is a member of the committee referred to naturally recalled a plan Mr. Delano outlined a few years ago for a grouping of Chicago railway terminals, but the directors of the Western Indiana at present are considering plans only for a station to provide for the needs of this road, and the Wabash, the Santa Fe, the Monon, the Erie and the Grand Trunk, which use its terminals, and nothing is being done with a view to carry out Mr. Delano's plan for a grouping of railway stations on Twelfth street. (June 18, p. 1333.)

CHILLICOTHE, Mo.—The Chicago, Milwaukee & St. Paul will build a passenger station.

DENISON, TEXAS.—The machine shops and planing mill of the Missouri, Kansas & Texas were destroyed by fire June 17. The loss is estimated at $200,000. Work is to begin at once replacing them with fireproof brick structures.

GARY, IND.—Contract for the passenger station to be built jointly for the Baltimore & Ohio and the Lake Shore & Michigan Southern has been given to the Leonard Construction Co., Chicago, Ill. (Oct. 16, p. 1168.)

MUSKEGON, MICH.—The paint shop and two coach shops of the Pere Marquette were destroyed by fire June 20. The loss is estimated at $70,000.

NORTH PLATTE, NEB.—The Union Pacific has plans made for a new roundhouse.

PORT ARTHUR, TEXAS.—The Kansas City Southern has given a contract to Spence & Howe to build two warehouses and docks, 110 ft. x 70 ft., and the other 100 ft. x 1,140 ft.

SAN ANTONIO, TEX.—According to press reports work is to be started soon on shops for the Kansas City, Mexico & Orient.

STAMFORD, TEXAS.—It is said that the Wichita Valley will build a seven-stall roundhouse, repair shops, etc.

STANTON, TEXAS.—The Texas & Pacific station was burned recently with a loss of about $10,000.

TEAGUE, TEXAS.—It is said the Trinity & Brazos Valley has formally announced that the company has made an appropriation of $50,000 for immediate use in improving the shops.

SIGNALING.

The Baltimore & Ohio has completed plans for the extension of the block system on the Chicago division, 150 miles, from Hicksville, O., to South Chicago, Ill. There will be 133 miles operated under the manual block system, from Hicksville to Miller's, Ind., and on the remaining 17 miles automatic signals will be installed. In the manual territory each outlying switch will be equipped with a telephone by which trainmen can communicate with the nearest block office.

The work of installation will be done by the railway's forces under the supervision of F. P. Patenall, Signal Engineer.

FOREIGN RAILWAY NOTES.

The International Conference for a Uniform Continuous Freight Train Brake, sitting in Berne, Switzerland, has adopted a statement of the requirements which such a brake should satisfy, and a program to serve as a basis for future tests of such brakes.

The Swiss are preparing to use electricity on some of their main lines of railways and eventually, possibly, on them all. The Gotthard railway will probably be electrified first, and its present stock of steam locomotives transferred to other lines. The commission, which is studying the subject, will probably report this year.

Some bridges were carried away by a flood in the valley of the Rhine February 5 last, and through traffic on the railway was interrupted until April 19, which was regarded as an unreasonably long time by some Germans. The complaints were such that the railway man's association set forth in the newspapers the causes for spending so much time in building a temporary bridge.

The International Sleeping-Car Co., whose headquarters are in Brussels, in 1908 had 1,147 passenger cars and 178 baggage cars. It had repair shops in Calais, Rouen, Irun (Spain), Ostend, Vienna, Berlin, Moscow and St. Petersburg, and at the close of the year finished one in Munich, and its building shops in Milan and St. Denis (a suburb of Paris). It owns hotels and buffets valued at about $700,000. The earnings were about 10 per cent. more than in 1907. A contract was concluded with the Russian State Railroads for the entire sleeping and dining car service running for 12 years. This includes limited trains over the Siberia Railroad. The contract for the Orient express, a limited train between Paris and Constantinople, was renewed for 15 years.

Supply Trade News.

George L. Wall, Mechanical Engineer of the Lima Locomotive & Machine Co., Lima, Ohio, has been made Assistant General Manager.

The Temple Iron Works, Temple, Tex., has received a contract from the Atchison, Topeka & Santa Fe for castings for its Texas system for one year.

The Union Switch & Signal Co., Swissvale, Pa., has declared the usual dividends of 3 per cent., quarterly, on both common and preferred stock, payable July 10.

B. D. Lockwood, mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis, has gone to the Pressed Steel Car Co., Pittsburgh, Pa., as assistant chief engineer.

The Perfection Metal Tie Co., Terre Haute, Ind., has been incorporated, with $20,000 capital stock. The incorporators are: B. H. Pinnell, R. D. Robertson and W. H. Mayer.

The Cincinnati Tie Co., Cincinnati, Ohio, has been incorporated, with $10,000 capital stock. The incorporators are: George W. Dorn, J. W. Bowland, W. J. Mulvihill, E. Adams and T. Schomaker.

R. L. Baker, who has been connected with the department of experimental engineering of the University of Wisconsin, of which he is a graduate, has entered the service of A. Bement, consulting engineer, Fisher building, Chicago.

The Isthmian Canal Commission, Washington, D. C., asks bids up to July 6 on electric conduits, wire, electric switches, etc., and other electrical supplies. (Circular No. 520A.) Bids are asked up to July 19 on steam shovel parts. (Circular No. 520.)

The General Railway Supply Co., Chicago, has received an order for metallic steel sheathing for use on 10 coaches, 10 sleepers and 4 diners, to be built for the Chicago, Minneapolis & St. Paul. Flexolite composition flooring, furnished by the General Railway Supply Co., is also being used in these cars.

The George M. Newhall Engineering Co., Philadelphia, Pa., which was recently appointed to represent in the East the Industrial Works, Bay City, Mich., for the sale of cranes, has booked the following orders: Western Maryland, 100-ton wrecking crane; Richard Hecksher Sons Co., Swedeland, Pa., 15-ton locomotive crane; Southern Ry., 100-ton wrecking crane, and Cranford Paving Co., Washington, D. C., 10-ton bucket crane.

The Pennsylvania Steel Co., Steelton, Pa., and its subsidiary companies are booking good contracts for rails. It recently secured contracts for building five vessels for its marine department at Sparrow's Point, Md. The frog and switch department is very busy. The B. and C. department is sharing the improved conditions; the merchant mills, billet mills, steel casting works and hammer department are also receiving good orders.

Officers of the Baldwin Locomotive Works, Philadelphia, Pa., the incorporation of which was recently quoted in these columns, are as follows: President, John H. Converse; vice-president and engineer, William L. Austin; vice-president and treasurer, Alba B. Johnson; general superintendent, Samuel M. Vauclain; secretary and assistant treasurer, William DeKrafft. The new company takes over all the assets and business of the firm of Burnham, Williams & Co. on July 1.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wis., announces that it has bought the plant, business and patents of the J. L. Schureman Co., Chicago. The manufacture of the Schureman types of controlling apparatus will be continued, and all agreements and contracts made by the J. L. Schureman Co. will be carried out by its successor. S. M. McFedries, General Manager of the Schureman company, has been retained by the Cutler-Hammer company, and he will remain in active charge of the manufacture and sale of Schureman apparatus. J. L. Schureman has retired.

E. L. Sudheimer, master mechanic of the Chicago Great Western at Red Wing, Minn., has resigned to go to the Peteler Car Co., of Minneapolis, Minn. This company, formerly the Kilgore-Peteler Co., recently increased its capital, and in addition to its line of dump cars, industrial cars, wheels and small rails, has taken up the manufacture of specialties in railway equipment and rebuilding and repairing standard railway cars. Colonel Peteler established the business in 1870, and, it is understood, was the inventor of the first dump car used for this purpose. Mr. Sudheimer will take full charge of the manufacturing part of the business. He is a graduate of the University of Minnesota in the mechanical engineering department, and also has a degree in electrical engineering. He began railway work in 1894 as a machinist's apprentice on the Northern Pacific. Two years later he went to the Great Northern, and in 1900 went to the Chicago Great Western as machinist. He served successively on that road as roundhouse foreman, chief draftsman, chief clerk in the mechanical department, mechanical engineer and finally master mechanic.

Interests connected with the Safety Car Heating & Lighting Co., New York, say that the improvement in the equipment situation during the past two months has been greater than in any similar previous period in the history of the industry. Although the demand for some lines of supplies is still considerably below normal, in others it is equally as good, and, in a few, somewhat above the level of this season in 1907. Judging by the amount of improvement in the way of new rolling stock and other equipment projected by the railways for the current year, the outlook is as good if not better than at this time two years ago. The company now has 70 Pintsch light gas plants located in as many different sections of the country, all running at normal. With the exception of 1908, in which the consumption of gas by the railways was about the same as in 1907, the average annual increase in this branch of the company's business has been about 10 per cent., and the indications are that during the current year this record will be equaled if not exceeded. The Pintsch lighting system, which the company owns outright, is now applied to over 33,000 cars in the United States, Canada and Mexico and to approximately 165,000 cars throughout the world. Another system of lighting, which it has taken the company some years to develop, embodies the axle-driven dynamo together with the lamp voltage regulator. Recent orders for equipping cars with this system are as follows: Chicago, Rock Island & Pacific, 157; Southern Railway, 125; New York Central, 25; Lehigh Valley, 15, and Pullman Company, 10. Each gas plant has a department equipped with the necessary machinery for taking care of the equipment in service and the company is renting as well as selling it.—*Wall Street Journal.*

TRADE PUBLICATIONS.

Chicago, Burlington & Quincy.—The company has issued a folder giving full information about free government land to be opened to homestead settlement in Montana, Idaho and Washington.

Northern Pacific.—"The Land of Geysers" is the title of a booklet on Yellowstone Park, which pictures the attractions of this "wonderland" and gives information about tours and short trips therein.

Coal Pockets.—The Link Belt Co., Philadelphia, Pa., has just issued Bulletin No. 72 on the subject of retail coal pockets, which contains complete descriptions and illustrations of a number of installations.

Midnight on the Alkali Southwestern.—This is the title of a little sketch published by the Ralston Steel Car Co., Columbus, Ohio, which has nothing at all to say about steel cars. It is sent out merely to furnish a moment's relaxation in the hot season, according to the foreword.

Punching and Shearing Machinery.—The Long & Allstater Co., Hamilton, Ohio, is distributing catalogue No. 21 on power punching and shearing machinery. It is a 208-page book, printed on calendered paper, with large half-tone illustrations of the more familiar forms of the company's product.

Refrigerator Car Insulation.—The Union Fiber Co., Winona, Minn., has issued a booklet giving a short historical sketch

of the different methods of insulating refrigerator cars in the United States, together with tests of the efficiency of the latest refrigerator cars conducted by several prominent railways.

Union Pacific.—A 38-page pamphlet, just issued by the Union Pacific, and entitled "Union Pacific Outings—Fishing in Colorado and Wyoming," contains a description of the trout fishing afforded along the line of this road. A large number of half-page illustrations show scenes at fishing in the trout streams.

Maximum Silent Chain.—The Link Belt Co., Philadelphia, Pa., has just issued Bulletin No. 84, which contains a brief description of the Renold type, maximum silent chain. The description is supplemented by illustrations of machines, etc., on which this chain is used. Roller chain driving is also illustrated and described.

Chicago & North Western.—A folder on resorts near Chicago in Illinois and Wisconsin gives brief descriptions and illustrations of summer resorts and also a large map of Illinois and Wisconsin. Another folder gives the fish and game laws in Illinois, Michigan, Iowa, Nebraska, Wisconsin, Minnesota, South Dakota and Wyoming.

Steel Wheels.—The Carnegie Steel Co., Pittsburgh, Pa., has just issued a new booklet on Schoen steel wheels, their designs and specifications. The standard specifications given in this booklet are dated June 1, 1909, and they conform to M. C. B. and A. R. M. M. requirements. Street and interurban railway wheels are also included.

Telephones.—The Western Electric Co., New York, in a new booklet, gives a graphic story of the campaign for the sale of telephone apparatus and supplies, which it has been carrying on during the past year. Much of this effort has been directed along the line of advertising. The booklet is made up of reproductions of these various advertisements.

Chicago & North Western.—A folder is being distributed giving information about low fares to the West and Northwest and a list of national conventions to be held in those parts. The company also has a pamphlet giving schedules of train service between Chicago, Milwaukee and fishing resorts in northern Wisconsin and Michigan, and another pamphlet giving summer service schedules between Chicago and Green Lake, Wis.

Bridge Railing and Iron Fencing.—The Chester B. Albree Iron Works Co., Allegheny, Pa., has just issued Catalogue No. 9, which contains a number of bridge railing designs not shown in previous catalogues, also fences, circular stairs, benches, etc. Only a few standard fence designs are shown, but these include sizes, details of connections, etc., intended to be of most assistance in designing and drawing up fence specifications.

Quaint Cape Cod.—This is the title of a decoratively gotten up pamphlet published by the passenger department of the New York, New Haven & Hartford, which describes various resorts on the Cape. The pictures are vibrant with the ocean breezes and dancing waves of the Atlantic. The folder also contains an excellent map of Cape Cod. A companion pamphlet published by the New Haven company describes the Buzzards Bay coast of Cape Cod and contains a number of very pretty pictures of that region.

Denver & Rio Grande.—A contribution to the literature of Archaeology has been issued by the Denver & Rio Grande. The title is Ancient Ruins of the Southwest, the text being by Dr. Edgar L. Hewett, Director of American Archaeology for the Archæological Institute of America. It is an illustrated pamphlet describing the prehistoric cliff and cave dwellings of Colorado, Utah and New Mexico. The book is artistic, well-printed on an excellent quality of paper and has the appearance of a publication intended for the trade rather than for free circulation.

Audits, Investigations, Etc.—H. C. Whitehead, Accountant and Auditor, 206 La Salle street, Chicago, has issued a small pamphlet covering work in auditing and accounting which he is prepared to undertake as follows: Periodical audits; special investigations; adjustment and statement of condition of accounts; application of accounting systems and determination of production costs. Mr. Whitehead was formerly a railway accountant and auditor, serving since 1872 successively as general freight office employee on the old Kansas Pacific and later as cashier, paymaster and traveling auditor; as accountant and paymaster on the Michigan Central in 1881; as traveling auditor on the A., T. & S. Fe.; auditor of the Southern Kansas; auditor of the Southern California and for nine years as general auditor and two years as consulting auditor for the A., T. & S. Fe at Chicago.

Prussian Railway Employees.

The state railway employees in Prussia have asked that opportunity be given for their sons to enter the service as soon as they have finished their studies in the grammar schools. The Minister has made provision for them accordingly, admitting such boys, sons of employees, when they are 14, provided they have their school certificates, and pass the requisite examinations for physical health, strength, hearing and seeing capacity, etc., limiting the employments in which they may engage to such as are suitable to their strength and capacity. Provision is made also for their further schooling while still in the service.

Kennicott Water Softeners in Africa.

The Natal Government Railway's report for the year 1908 says that owing to serious troubles being experienced in the Durban district with the pitting of barrel bottoms of tender and other engines, it has been proposed to introduce a Kennicott water softening plant (Kennicott Water Softener Co., Chicago Heights, Ill.) at Greyville and Hill Crest, so as to enable engines working on the Durban-Cato Ridge section to use the treated water only. At Sundays River in the Ladysmith district, the Kennicott water softening and filtering plant continues to give every satisfaction. During the heavy rains in the upper districts, its utility for clarifying the muddy river water was fully demonstrated.

Stoever Pipe Threading and Cutting Off Machine.

The improved pipe threading and cutting off machine illustrated herewith shows new features on this particular type of tool. This machine has been designated 1909 Model.

Fig. 1 shows a No. 8 size machine having a capacity for threading and cutting off pipe from 2½ in. to 8 in., inclusive. The machine shown is belt driven, but can be readily changed to motor drive, using constant-speed motor. This machine has always been a high-speed, rapid-producing tool, but in the new model the speed has not only been increased, but a number of new features have been added. The former massive construction of the headstock and beds have been retained, as well as the heavy three-jaw independent chucks on both the front and the rear spindle, the rear chuck being furnished in addition with flange grips for making up flanged work. These chucks, both the front and the rear, are made in one piece, the slots for the slides being milled out of the solid. The internal driving gear and one-piece casting headstock, carrying all of the bearings, have also been retained with a few changes in design. This is an all-geared machine, all speeds being obtained through gears cut from the solid, enclosed in an oil-tight gear box, allowing the gears to run in oil and permitting the use of a single driving pulley, doing away with the step pulley and the shifting and slipping of belts. On this machine are given 10 speeds, provision being made for a separate speed for iron and steel pipe. The bore of the arbor is made sufficient in diameter to permit the passing through of extra heavy 8-in. fittings, which is the maximum capacity of this size machine. The oil pump of the machine is of the rotary type and fastened to the main driving shaft, insuring a steady and constant flow of oil for all sizes of pipe, which means a great saving in the wearing of the dies and ability of the machines to be speeded up for high-speed cutting.

Fig. 2 shows the patented sliding and floating die head. This head is arranged to slide on ways on the front of the die stand, allowing the head to move and accommodate itself to any eccentricity in the pipe, relieving tha machine of a strain which is usually encountered on a rigid head, and insuring perfect threads. It also permits the head to be pushed out of the way for putting pipe in the front or rear end of the machine without injury to the chasers. The die head can also be pushed out of the way and clear the front chuck, permitting a cutting off distance of 3 in. for nipple work. This is one of the new features. The adjusting mechanism for setting the chasers is simple and easy of operation. The hand knob for making the adjustments is directly in front of the

operator, as is also the scale on the face of the cam ring. As the lever comes to rest on the screw, the straight-line feature is secured, and no digging into the pipe before the chasers and release is possible. The illustration shows the steel-clad front-opening die ring, exposing the interior mechanism of the cam ring and die ring, and shows also how the improvement in the way of a front-opening die ring facilitates the withdrawal and insertion of chasers. In this design the head can at all times be kept clean and free from chips and grit that might work their way into the die head. When the front of the head is closed the operator can insert or withdraw the chasers from the inside of the head, giving the operator the option of using the die head either opened or closed for removing or inserting the chasers. The bottom of the slots of this die head, in which the chasers travel, are reinforced with hardened steel plates, which keep the lead of the chasers true at all times and insure perfect threads. The cam-ring construction is of the interchangeable type. The cams are not made a part of the ring, but are of steel, each cam being separate and inserted into the ring, making replacement possible, if necessary, at a nominal cost and not necessitating the closing down of the machine should a cam become worn or broken. The chasers are of the interchangeable type—that is, each size is not only interchangeable in the same head, but any one chaser in a set can be replaced without reference to the balance of the chasers. This does not necessitate the return of the entire set to the factory should one of the chasers become broken. These chasers are made in one piece of special steel and are especially adapted to the threading of steel pipe, whether hard or soft. The chasers for the top or the bottom of the die ring are all the same and are numbered to correspond to the slots in the die ring.

Fig. 3 gives a rear view of the stand and head, showing the arrangement of the cutting-off tool, reaming tool and steady slides. The steady slides are interchangeable and easily replaced by the operator when necessary, doing away with the fork construction which necessitated replacement from the factory. The method of delivering the oil to the dies and cutting-off tool through steel flexible tubing is also shown, as well as the die head clearing the front chuck for cutting-off purposes, showing how close the die stand and cutting-off tool can be drawn up to the front chuck.

The machine is made by the Stoever Foundry & Manufacturing Co., Myerstown, Pa.; the principal sales office is in New York. The company makes a complete line of machines, both of standard type and automatic, in sizes from ¼ in. to 12 in.

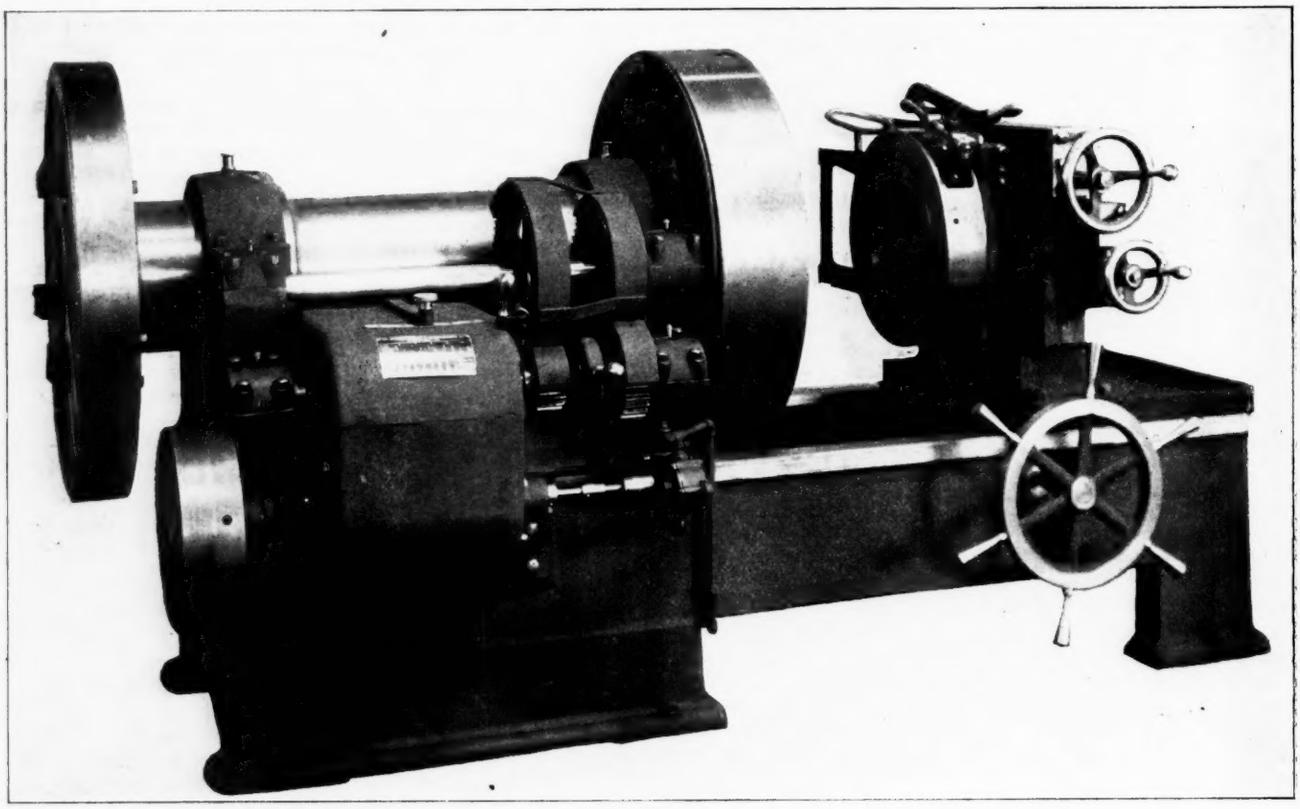


Fig. 1.

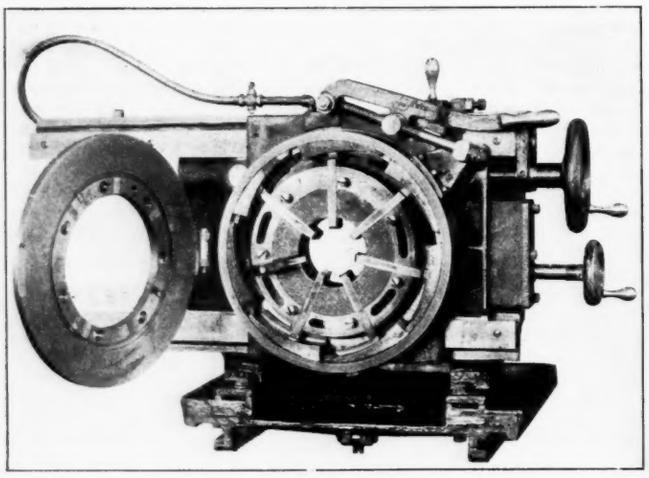


Fig. 2.

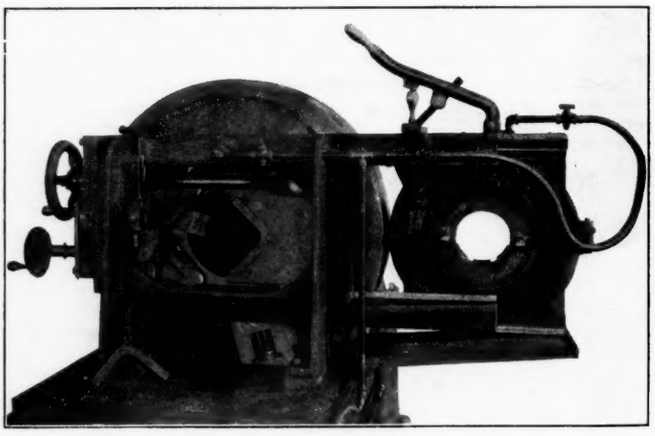


Fig. 3.